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AMERICAN ANTIQUITY

Vol. XXIII April, 1958 No. 4, Pt. 2

EDITORIAL

THE FOUNDING of a major new archaeological quarterly is of significance to archaeologists everywhere. We have generously been given permission to reprint the following important discussion of our Soviet colleagues' past problems and future goals. Such a statement is instructive in numerous ways. It is obvious that many of their aims are similar to ours — prompter publication of new archaeological findings, coordination of activities among numerous institutions with rapidly expanding archaeological programs, more effective use of neglected museum collections, strengthening of public appreciation of archaeological finds, increase of international exchange of archaeological data, and development of closer working relationships with other scholarly disciplines — to mention a few of the more concrete. In these and other goals which we share as students of man's past, we wish the editors and staff of the new journal success.

ON THE TASK OF THE JOURNAL "SOVIET ARCHAEOLOGY"

Reprinted from *Sovetskaia Arkheologiia*, Vol. 1, No. 1, pp. 3-6, 1957
Translated by Lawrence Krader

THE YEAR 1957 marks the beginning of the publication of the journal *Sovetskaia Arkheologiia*, which will appear quarterly.

The development of archaeological investigations in the USSR, directed to the study of the most ancient history and culture of the peoples of our country, has currently demanded the institution of such a central periodic publication to assist in the consideration of the most important questions and the publication of the latest discoveries.

The journal *Sovetskaia Arkheologiia* is the successor to the collections published under the same name by the Institute of the History of Material Culture of the Academy of Sciences, USSR; but its tasks are considerably broader, and the possibility of realizing the development of historical science considerably greater.

The Soviet archaeologist is above all a historian. The primary task of Soviet archaeology and the respective journal published by archaeologists is elucidation of the chief theoretical and concrete problems of the history of precapitalist formations and the study of the regularities of historical phenomena.

It is natural that in an archaeological journal the greatest prominence should be given to those questions the solution of which is based primarily on archaeological materials. Here it would be impossible to give a list of all the specific historical problems which may be elucidated on the pages of *Sovetskaia Arkheologiia*, but attention should be drawn to a few of them. Thus, for example, questions of the economy of ancient societies to which archaeologists constantly return nevertheless remain inadequately investigated, in particular the question of the origin and early phases of pastoralism, early agriculture in Europe and Asia, and so on. In recent years we have dealt but little with problems of primitive thought and art, problems of ancient cultural connections and influences. Archaeologists may have a word to say about the treatment of such problems as the origin and developmental forms of slave-owning society in central Asia, the rise of Russian feudalism, and the like.

It is absolutely necessary to deepen and perfect the treatment of problems of theory and practice in archaeological investigation. The great number of new finds by Soviet archaeologists, the increased quantity of materials, which can help to solve the solution of important historical problems, demand a great creative effort of the scholar in the direction of maximum precision in historical inferences.

Well-developed methods of investigation must be mastered for these ends.

Marxism is the only correct ideological base of the archaeological and other historical investigations of Soviet scholars. However, creative Marxism demands not a declared avowal of this or that principle, but its concrete application to the given branch of science. The achievements of Soviet archaeology which concern the theoretical foundations of science are far lower than the achievements in the field of concrete historical themes. During the first decades of existence of Soviet archaeology a sociological schematism arose, the clearest expression of which were the theories of the schools of M. N. Pokrovsky and N. Y. Marr; many were the scholastic battles and attempts to replace theory by different explications of the expressions of the classics of Marxism. This hindered the treatment of the theoretical bases of archaeology, and we have few works in this field. Meanwhile the definition of object and methods in archaeology, the solution of questions on the limits of knowledge based on archaeological sources, on the justice of different social, historical and historico-ethnographic reconstructions based on these sources, and similar questions are not abstractly theoretical, but have great significance for the practical work of archaeologists. The existence of a journal permits a broad discussion of theoretical problems of archaeology and will assist in the mastery of the Marxist-Leninist method of investigation.

On the basis of the study and mutual informing of the vast materials excavated over decades of archaeological field work, Soviet scholars have provided a series of valuable generalizing works summing up the results of investigations of individual important themes on broad geographic regions. However, in recent years a tendency has arisen, not always prescribed by scientific purposes, to stimulate generalizing works not primarily for scientific purposes, and to retard the works which are source probing. This has led to "generalization" running ahead of publication, and at times even ahead of the study of the very materials on which alone they should be founded. An urgent necessity has arisen to bring the plentiful and variform archaeological materials into strict order and scientific system. The Institute of the History of Material Culture to this end is preparing to institute the publication of the *Corpus of Archaeological Sources of the USSR*. The journal is called upon to play a large role in the preparation of this publication. The pages of the journal will be devoted to [the consideration of] questions of methods, dating, typological investigations, and so on. It is of moment to correct the already extant classical systems of Montelius, Déchelette, Gorodtsov, Spitsyn, and others, as has been done hitherto. But it is also important, by applying and improving the old, to cultivate new, more precise methods of dating objects, founded on archaeological data, and on the achievements of physics and other natural sciences. Chronology and cartography, that is, the definition of time and place of historical phenomena, are the principal elements of archaeological investigation, and demand special attention and scientific treatment. Needless to say, methods of archaeological field work and the further processing of excavated materials in the laboratory will also have to be considered in the pages of our journal. These are very important questions, to which we have been giving much attention in recent times. The technical equipment of expeditions and laboratories, the adoption of the latest achievements of science and techniques in archaeological work is not only a material problem, but also a scientific methodological one. The new techniques demand new methods of work.

Much has been written by archaeologists in the postwar years about the ethnic identification of archaeological cultures. This is an important theme closely connected with questions of ethnogenesis, being resolved by archaeologists together with linguists, ethnographers, and representatives of other social sciences. However, this theme should not obfuscate others which are now being little studied, for instance, questions of the economy of ancient societies, stages of the cultural development of different territories, and so on. The acquisition of cultural-stratigraphic cross sections of considerable territories will permit a more objective solution of questions of ethnogenesis on the basis of archaeological data, liquidate preconceptions in certain minds, and permit a decision in each specific instance as to what the archaeological cultures are: ethnic or historical commonalties, economic-culture types, historical ethnographic regions, or specific stages of cultural development.

Soviet archaeology has passed through a certain period in its growth in which materials

excavated on the territory of the USSR were examined in isolation from the data of European and world archaeology. Contributing to this was the support of hypertrophic forms of the theory of autochthonism and negation of external connections and influences, the recognition of which might somehow diminish the achievements of the peoples of the USSR. Needless to say, these false principles impeded the development of our science and diminished the role which Soviet scholars could play in the development of archaeology the world over. The absence of practical contacts with world science also did considerable harm. For this reason the tasks of the journal must be not only to examine the facts of national history on the broad scale of world history, but also to provide a constant source of information to the Soviet archaeological community on archaeological work abroad. The main achievements of world archaeology should be well known to the Soviet archaeologist and historian. The editors will be happy to provide space in the journal for the work of archaeologists of the people's democratic countries, and of progressive scholars of capitalist countries, which will strengthen scientific cooperation. It must not be forgotten that the Soviet scholars and many scholars of bourgeois countries have ideological positions which differ in principle. A great conflict of ideas must lead to strengthening not only of method but of factual material.

Special attention must be paid to the section on critique and bibliography. Both national and foreign archaeological literature should be fully and objectively elucidated. In this connection it follows that reviews of books should not have a guiding and reference character, such as has often been the case with us, but should expound a deep scientific analysis of the work under review. Remarks directed to the author of a book gain scientific value only when the reviewer can oppose the author's conception with a well-argued point of view.

Together with reviews and critical surveys the journal will publish bibliographic reports, annotations, and short references to book publications.

Discussions, of course, will be held not only on the pages of the critique section, but may also take place in each investigatory article. But in addition the editors intend to develop for special consideration a series of controversial archaeological issues.

Dozens of archaeological expeditions are at work annually in our country. In addition to the Institute of the History of Material Culture and the archaeological institutes of the union republics, much archaeological work is conducted by museums, universities, and pedagogical institutes. Many of the archaeological finds are made by persons without professional archaeological training. The accumulation of new data in archaeology proceeds at an extraordinarily rapid rate; the sooner they are in the possession of science, the sooner many controversial and unclear issues will be resolved. Therefore the publication of the results of archaeological excavations of all the latest discoveries in the journal will in a short time place the accumulated scientific treasures at the actual disposition of science. It is necessary to cast systematic light on the achievements of our own and world science in the accumulation of new archaeological data, in filling in the blank spots on the archaeological map of the world. To this end we will publish regional surveys of different territories and countries.

The tasks of the journal should be not only to inform about excavations and activities of archaeologists of our country; no less important is the aid to the various institutions which conduct archaeological investigations, the coordination of their activity, the elaboration of the plan of further work.

One of the tasks of the journal is museum relations. Museum workers participating in investigations may in part, with the help of the journal, publicize museum collections which, unfortunately, often remain long outside general scientific circulation. This will be aided by the presence of a section of the journal, "Short Articles and Notes," in which the most variegated materials—newly discovered as well as long preserved in museums, small scale investigations, and informational communications can be published.

The chronicle section of *Sovetskaia Arkheologiia* will comprise communications about results and achievements of archaeological institutes, local museums, as well as local societies in pedagogic institutes and schools, about plenary sessions and conferences considering archaeological problems, and about the work of archaeological institutions, archaeological facul-

ties of universities, and archaeological laboratories.

In addition, questions of teaching of archaeology in universities and pedagogic institutes should fall within the purview of the journal, as well as questions of popularization and propagation of archaeological knowledge.

Acquaintance with state archaeological reserves and monuments of the past protected by law, questions of restoration and protection of these monuments, and the participation to this end of sectors of the population, all depend to a high degree on the activity of archaeologists and their scientific publicists, educating and strengthening the respect for the native past.

In order to facilitate the spread of such publicity, as well as for fuller and wider popular utilization of the achievements of archaeological science, the editors of *Sovetskaia Arkheologiia* are preparing the publication of a series of articles to help the teacher of history and the student of local lore. This will not only make possible the improvement of history instruction, making it more attractive through the adduction of new archaeological data, but will permit the treatment in popular form of these data.

The editors readily offer the pages of the journal *Sovetskaia Arkheologiia* to representatives of such auxiliary historical disciplines directly touching on archaeology, as numismatics, sphragistics, and epigraphy, as well as to representatives of other disciplines (physical anthropology, ethnography, geology, and so forth) in their investigations which touch on archaeological data.

We would wish that the journal *Sovetskaia Arkheologiia* might be not only a scientific organ of interest to a narrow circle of scholar-specialists, but also a publication of interest to all those who hold the achievements of archaeology near and dear — a publication read not only by professional archaeologists but by scholars working in other fields of science, teachers of history, students of local lore, museum workers, and other representatives of the Soviet intelligentsia.

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ESTIMATED CORRELATIONS AND DATING OF SOUTH AND CENTRAL AMERICAN CULTURE SEQUENCES

GORDON R. WILLEY

THE CORRELATION of culture sequences provides the basic framework of archaeology, the essential understructure of any interpretations which may follow. In the New World, prehistoric sequence correlations seldom are projected for territories of greater size than the conventional culture area. The southwestern United States, Peru, or, at the largest, eastern North America are classic examples. The reason for such a restriction seems to be that native American cultures but rarely outrun the boundaries of their natural environmental settings, and it is difficult to effect alignments of culture phases or units on an interareal basis. To be sure, diffusions of one kind or another have taken place across major area divisions but these are complicated by factors of trait modification and time lag so that chronological organization is a most complex task. Nevertheless, long-distance sequence correlations are of such interest and importance in American studies that they must be attempted sooner or later. They are indispensable for the eventual solution of the main problems of migration, diffusion, and the movements of cultural influences and counter-influences of the pre-Columbian past. Hence, as a beginning, I am presenting here a series of archaeological sequence correlations along lines which extend through most of the South American continent and into the West Indies and Central America (Fig. 1).

The primary objective of these coordinated sequence charts is the placement of culture phases in time, with reference to each other and all with reference to B.C. or A.D. dates. This is, in effect, what Rouse (1955) has called "distributional correlation." It is not "genetic correlation" (Rouse 1955) or "synthesis" in the sense of an attempt to relate cultures as to their derivations and connections (Willey and Phillips 1957); nor is it a developmental scheme. Implications of genetic relationships and insights into developmental series may be derived from these correlations, but they are not the means of establishing them. In examining the charts it should be kept in mind that the horizontal lines are put in only to facilitate the temporal correlations of archaeological cultures with each other and with the absolute dates. They do not mark off culture types or stages nor serve to indicate specific breaks in local sequences. A minimum of specialized terminology and taxonomy is used. The concept of the *phase*, as the smallest meaningful culture unit with reference to the archaeological residue of a former society, is employed in the treatment of local and regional sequences (Phillips and Willey 1953: 620-3). Occasionally, the terms *horizon*, *horizon style*, and, to a lesser extent, *tradition*, come into the discussion in the attempt to correlate phases. Aside from these few devices there is no adherence to any classificatory scheme.

The methodology of correlation is varied. Radiocarbon dating provides most of the absolute dates, and it is obvious that without this aid even such a crude, initial effort as this would be next to impossible. I have not, however, placed sole and complete reliance upon the radiocarbon results but have considered and weighed the dates provided by this method in the context of all available dating evidence. In some areas it was possible to bring such diverse methods as glottochronology, native calendars, and geological estimates to bear upon correlations and to check radiocarbon readings. More frequently, I was forced to fall back upon interpretations of stratigraphies, seriations, and the cultural similarities between phases for relative dating and cross-dating. In instances of region-to-region correlations within major areas these more typically archaeological methods of sequence matching probably gave reasonably reliable results, but in the adjustments of sequences from area to area, cultural similarities are more generalized and attentuated and, consequently, more suspect as indicators of chronological equivalence. The text that accompanies the charts explains the methods and means employed in the various correlations, the bibliographic sources, and my opinions on the validity or dubiety of both the relative and absolute chronological placements. It is not, however, a detailed critique. Pages of argument and discussion could be written about most of these

correlation charts. In fact, the purpose of presenting them at this time is as foci of discussion.

That this exercise is a trial and tentative one should not need saying. As we look back over the history of American archaeological errors that have attended enterprises of sequence correlating and "guess-dating" of even much less ambitious scope, there can be no illusion about the permanence of these results. Admittedly, it is too early to bring off a secure chronological alignment of the data of South and Central American archaeology, but it is not too soon to take the first exploratory steps in this direction.

It should be mentioned that, for limitations of space, the various sequence charts do not comprehend all archaeological cultures that are described or named in the literature, nor do I present full bibliographies on any particular relative chronology or comparisons of chronologies; however, a sufficient number of cultures is taken into consideration in each locale or region so that the reader, with recourse to appropriate references may appraise my opinions.

Fig. 1. Lines of estimated sequence correlations in South and Central America. *A-B*, Peru-Bolivia; *B-C*, Peru-Ecuador-Colombia; *C-D*, Colombia-Central America; *C-E*, Northern Colombia-Northern Venezuela; *E-F*, Orinoco Delta-West Indies; *E-G* and *G-H*, Orinoco-Ucayali-Upper Madeira; *E-I* and *I-G*, Orinoco Delta-Amazon Delta–Ucayali; *I-J* and *J-K*, Amazon Delta-Eastern Brazil-Paraná River; *K-L*, Paraná River-Tierra del Fuego; *L-M* and *M-A*, Tierra del Fuego-Northern Chile-Bolivia; *M-K*, Northern Chile-Northwestern Argentina-Paraná River; *A-H*, Bolivia-Upper Madeira.

Finally, it should be explained that this has been, in large part, a cooperative study. The sequence charts are an outgrowth of my seminars in South American archaeology at Harvard during the years 1952-53, 1954-55, and 1956-57. The work of the graduate students in these seminars, particularly the one of 1956-57, has been of great help. I wish to acknowledge, here, the seminar work of Donald W. Lathrap, Sophie D. Coe, John Ives, George Cowgill, Arthur Rohn, James Sackett, Alan Bryan, Roger Green, David Gradwohl, Donald Thompson, John Ladd, and Barbara Kerstein. In addition, colleagues, both in this country and in Latin America, have offered numerous suggestions and criticisms of an earlier draft of this paper or have provided me with information as yet unpublished. In this connection, I am in the debt of Clifford Evans and Betty J. Meggers, for information concerning Ecuadorean sequences and Amazonian archaeology, of Emilio Estrada, of Guayaquil, for data on Ecuador, of Gerardo Reichel-Dolmatoff for recent sequence information from northern Colombia, and of Irving Rouse and J. M. Cruxent for their advice and opinions upon Venezuela and the West Indies. With full credit to all of these individuals, I also absolve them of any responsibility for my less than conventional leaps through time and space.

Peru-Bolivia (Line A-B)

The Peru-Bolivia chart (Fig. 2) is an abbreviated version of various sequence presentations for that area or portions of it (Bennett and Bird 1949; Strong and Evans 1952; Rowe 1956; Strong 1957). The north coast column is based upon the Chicama, Moche, and Virú valleys; the central coast combines the Chancay, Ancon, and Chillon-Rimac drainages; and the south coast centers upon Paracas-Ica-Nazca. North and central highland regions are omitted, but equations with sequences from those regions may be approximated easily. Similarly, although sequences are not presented in full detail on the accompanying chart, the chrono-

logical positions of all phases and subphases not entered will be evident upon reference to the standard literature.

San Pedro de Chicama (Bird 1948) and Viscachaní (Menghín 1953-54) are placed by sheer guess. The central Andean Hunacayo cave lithic assemblages (Tschopik 1946) might also be aligned on a comparable early level. Certain projectile points from the Viscachaní site zone resemble those of the Ayampitín phase of Córdoba, Argentina. Accordingly, a separation has been made in this column between a Viscachaní and an Ayampitín industry. There are possible old lithic industries on the Peruvian coast which may antedate the later incipient agricultural sites. San Nicolas (Strong 1954), south of Nazca, and the lower levels of a shell heap at the mouth of the Río Ica (Engel 1957) are examples.

The incipient agricultural, preceramic horizon along the coast is well established, but, so far, radiocarbon dates are all from the north. These dates are reasonably consistent, ranging from about 2500 to 1800 B.C. for the earliest agricultural levels. A plain pottery horizon marks the later centuries of this incipient agricultural era. It is attested to by the stratigraphy at Huaca Prieta (Bird 1948), the Early Guañape phase in Virú Valley (Strong and Evans 1952), the Early Ancon lower levels (Willey and Corbett 1954), and the excavations of Chira-Villa, near Lima (Engel 1957).

Cupisnique and Middle Guañape, both phases on the Chavín horizon, have dates of about 1200 to 700 B.C. Early Ancon-Supe relates closely to these. On the south coast, Early Paracas pottery has some design and element similarities in common with the Chavín horizon phases of the north and center, but is, otherwise, rather different. I have equated Early Paracas with Cupisnique on the chart, but do so with considerable hesitation. Negative painted pottery is an element in Early Paracas, and negative painted ware in the north

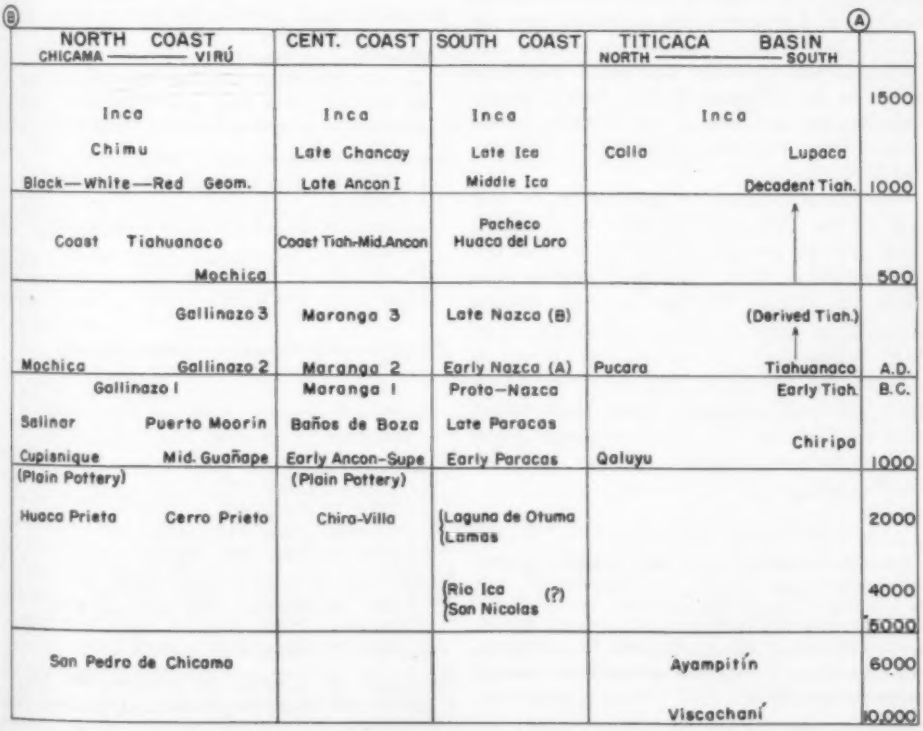

FIG. 2. Peru-Bolivia (line *A-B*) sequence chart.

is stratigraphically later than Cupisnique. Furthermore, although there are no available Early Paracas dates, the immediately subsequent Late Paracas phase has radiocarbon dates in the early centuries A.D. Thus, although I follow conventional alignments in the present chart, there is at least a reasonable possibility that the entire early ceramic sequence on the south coast may have its inception a few centuries later than the first appearance of pottery farther north.

In comparing the north and south coasts on the Mochica and Nazca level, some of the Mochica dates appear substantially earlier and produce the same failure of alignment observed for Cupisnique and Paracas. Other more recently rendered radiocarbon dates on Late Mochica are more in line with those of the Nazca culture. Like all charts this one gives an impression of greater certainty than actually exists. A single example of this of which Peruvian specialists will be aware is the Mochica-Gallinazo arrangement. It follows Strong and Evans (1952) and Willey (1953) in seeing Mochica as a relatively late expansion into the Virú Valley. There is the other possibility that Gallinazo was a longer and more important period in the Chicama Valley than is shown and that the full run of the civilization was more or less contemporaneous in both Chicama and Virú.

The recent radiocarbon readings on, or very near to, the Tiahuanaco horizon on the south coast, are our first absolute dates for this important marker style. The dates, ranging from about A.D. 700 to 1000 average only slightly earlier than Rowe's (1945) reckonings. "Derived Tiahuanaco" on the chart is entered to indicate the estimated time point at which these "derived" influences began their spread from the Tiahuanaco cultural continuum down into the Bolivian lowlands (Bennett 1936; see also Fig. 13).

Radiocarbon Dates Pertinent to Line A-B

For convenience, radiocarbon dates available and pertinent to the discussion of each chronological profile chart are tabulated following that particular chart discussion. Most dates have been rendered as B.C. or A.D. by the subtractions of, or from, the date A.D. 1950. Exceptions are those quoted from Strong (1957) or from Rouse (personal communication, 1957).

Huaca Prieta, beginning dates:
2348 ± 230 B.C. (Libby 1955, C-598)
2307 ± 250 B.C. (Libby 1955, C-313)
1910 ± 100 B.C. (Broecker, Kulp, and Tucek 1956, L-116B)
1830 ± 100 B.C. (Broecker, Kulp, and Tucek 1956, L-116A)
1700 ± 400 B.C. (Kulp, Feely, and Tryon, 1951 L-116B)

Huaca Prieta, beginning plain pottery period date:
1016 ± 300 B.C. (Libby 1955, C-321) (See also, Bird 1951.)

Early Guañape, plain pottery period dates (charcoal samples):
1850 ± 150 B.C. (Kulp and others 1952, L-122C)
1150 ± 200 B.C. (Kulp and others 1952, L-122F)

Cupisnique date:
715 ± 200 B.C. (Libby 1955, C-75)

Middle Guañape date (charcoal sample):
1200 ± 90 B.C. (Kulp and others 1952, L-122A)

Gallinazo (negative painted pottery at Huaca Prieta) date:
682 ± 300 B.C. (Libby 1955, C-323)

Mochica (Moche and Virú Valleys) dates:
873 ± 500 B.C. (Libby 1955, C-382)
A.D. 112 ± 190 (Libby 1955, C-619)
A.D. 656 ± 80 (Strong 1957, L-335A)
A.D. 656 ± 80 (Strong 1957, L-335B)

Paracas Necropolis (probably Late Paracas phase) dates:
386 ± 300 B.C. (Libby 1955, C-271)
240 ± 350 B.C. (Libby 1955, C-271)
A.D. 100 ± 250 (Kulp, Feely, and Tryon 1951, L-115)
A.D. 400 ± 200 (Kulp, Feely, and Tryon 1951, L-115)
A.D. 200 ± 90 (Broecker, Kulp, and Tucek 1956, L-115)

Late Paracas (Cahuachi, Nazca Valley) dates:
A.D. 110 ± 80 (Broecker, Kulp, and Tucek 1956, L-268 B)
A.D. 240 ± 80 (Broecker, Kulp, and Tucek 1956, L-268A)
A.D. 116 ± 100 (Strong 1957, L-335D)
A.D. 116 ± 100 (Strong 1957, L-335C)
124 ± 160 B.C. (Strong 1957, W-422)

Proto-Nazca (Cahuachi, Nazca Valley) dates:
A.D. 320 ± 80 (Broecker, Kulp, and Tucek 1956, L-268D)
A.D. 490 ± 80 (Broecker, Kulp, and Tucek 1956, L-268C)

Early Nazca (A) (Nazca Valley) dates:
527 ± 200 B.C. (Libby 1955, C-521)
A.D. 269 ± 250 (Libby 1955, C-521)
A.D. 271 ± 200 (Libby 1955, C-658)
A.D. 636 ± 250 (Libby 1955, C-460)

Middle Nazca (A) (Nazca Valley) dates:
A.D. 520 ± 80 (Broecker, Kulp and Tucek 1956, L-268H)
A.D. 336 ± 100 (Strong 1957, L-335G)

Late Nazca (B) (Chaviña and Nazca regions) dates:
A.D. 630 ± 60 (Barendson, Deevey, and Gralenski 1957, Y-126)
A.D. 526 ± 90 (Strong 1957, L-335E)

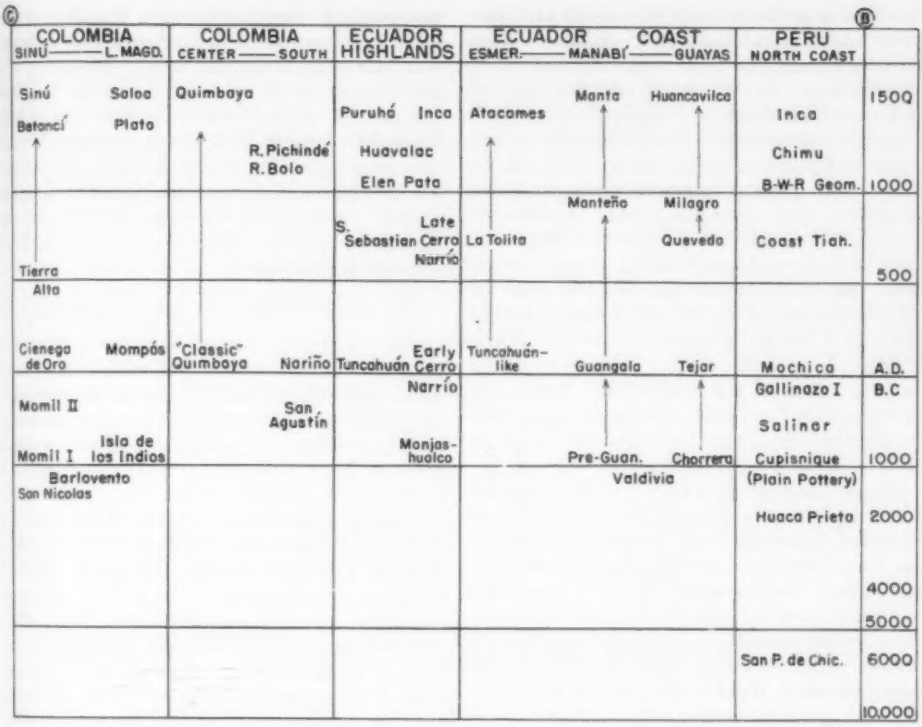

FIG. 3. Peru-Ecuador-Colombia (line *B-C*) sequence chart.

Huaca del Loro (*Nazca Y-to-Taihuanaçoid*) (*Nazca Valley*) *dates*:

A.D. 750±80 (Broecker, Kulp, and Tucek 1956, L-268G)

A.D. 1050±70 (Broecker, Kulp, and Tucek 1956, L-268E)

A.D. 980±70 (Broecker, Kulp, and Tucek 1956, L-268F)

A.D. 756±90 (Strong 1957, L-335F)

PERU-ECUADOR-COLOMBIA (Line B-C)

Line B-C chart (Fig. 3) repeats the Peru north coast column and attempts to relate, in geographical order, regional sequences of the Ecuadorean coast and highlands, southern and central Colombia of the Cauca and Magdalena Valleys, and the lower Magdalena-Sinú River country of the Caribbean coast. The evidence linking north Peru with Ecuador is largely that of ceramic similarities seen in Cupisnique, on the one hand, and the Ecuadorean Chorrera phase on the other. The succeeding Guangala and Tejar phases of the Ecuadorean Guayas coast and basin likewise have a number of close ceramic parallels in the Peruvian Salinar and Gallinazo phases (Evans and Meggers 1957). It is also noteworthy that the earliest culture yet known from the Ecuadorean coast, the Valdivia, is associated with shell mound sites and has a pottery complex which shows some relationships to the Peruvian coastal mound phases of pre-Cupisnique times (Estrada 1956).

Within Ecuador it should be pointed out that Bushnell's (1951) Pre-Guangala phase is essentially the same as Chorrera (Estrada 1957a, b), and the Monjashuaico (Bennett 1946a), of the southern Ecuadorean highlands, is also a similar ceramic assemblage. The Valdivia, Chorrera, Guangala, and Manteño sequence of Guayas is duplicated in Manabi province (Estrada 1957b). The site of Cerro Jaboncillo (Saville 1907-10), famed for its U-shaped stone thrones, has pottery figurines relating it to Guangala. Whereas Manteño of

the coast is a direct development out of Guangala, Quevedo and Milagro of the Guayas Basin are intrusives over Tejar and appear to be linked to the late burial mound cultures of Esmeraldas (Estrada 1957a). There is little sequence information from Esmeraldas as yet. Certain figurines (D'Harcourt 1947; Rowe 1949) and pottery resemble types at Cerro Jaboncillo and Guangala, and, presumably, such sites as La Tolita (Ferdon 1940-41) may date back as early as Guangala and Tuncahuán. La Tolita vessels and figurines have intriguing resemblances in both Middle American and Peruvian directions (Corbett 1953). Stratigraphic archaeology for this region is long overdue. Across the Colombian border, at Tumaco, Cubillos (1955) has made a start, and his 2-period sequence there probably parallels developments in Esmeraldas.

Jijón y Caamaño's (1927) Puruhá sequence is arranged in the Ecuadorean highland column, but, following Estrada (1957a) the dubious Proto-Panzaleo I and II phases have been eliminated. The remainder of Jijón's sequence is placed more or less as he has indicated (Jijón y Caamaño 1927, 1930, 1951), with the 3-color negative-painted style of Tuncahuán correlating with the 3-color negative of Guangala and, more remotely, with the Peruvian 3-color negative style of Recuay culture and Gallinazo. For a discussion of some of these problems and for a critical examination of Jijón's chronologies with reference to their own excavations in the Ecuadorean south highlands see Collier and Murra (1943), Collier (1948), and Bennett (1946a). My equation of San Sebastian (Guano) and the Peruvian Tiahuanacoid horizon follows Jijón; Estrada (1957a) moves San Sebastian up to equate with Chimu; Kroeber (1944), on the other hand, sees Recuay-like elements in San Sebastian pottery.

In moving into southern and central Colombia there are very few clues to correlations with Ecuador. Typological resemblances, in pottery and stone carving are the only possibilities so far, and none of these are definitive. The Nariño-Quimbaya negative-painted ware may have connections with Guangala and Tuncahuán through a Carchi negative-painted style in the north highlands of Ecuador (Bennett 1944). San Agustín, with its stone statues, has been said to have resemblances to Peruvian Chavín. As yet, these seem to be extremely tenuous, and the placement of San Agustín as early as I have done is no more than a guess.

In northern Colombia, at the mouth of the Sinú River, the Momíl I and II phases (Reichel-Dolmatoff and Dussán de Reichel 1956; Reichel-Dolmatoff 1957) have ceramic decorative techniques, vessel forms, and other items which relate to Chorrera and Tejar and, more widely to Middle American and Peruvian Formative cultures. They are dated as early as they are on this basis.

Colombia-Central America (Line C-D)

The Formative period similarities between Middle America and Peru, and the linkages of these with Momíl and Chorrera, suggest that important currents of diffusion were in existence in the first millennium B.C. This has been pointed out by several authors (Strong 1943; Porter 1953; Willey 1955a, b), and I have speculated that these currents were running from north to south (Willey 1955a, b). In view of this, the territory of lower Central America would appear to be a likely place in which to discover evidences of these early connections. To date, only the Monagrillo culture of Pacific Panama suggests such a possibility (Willey and McGimsey 1954). In most respects, however, the Monagrillo phase has an Archaic cast (Willey and Phillips 1958), and it is doubtful if it represents the village-based agriculture which is usually associated with the Formative period cultures of Middle and South America. It appears as a direct outgrowth of the preceramic Cerro Mangote phase (McGimsey 1956), being differentiated only by the addition of rather simple incised and punctated pottery. I see general resemblances between the Monagrillo pottery and that of the Ecuadorean Valdivia phase and the Colombian Barlovento phase (Reichel-Dolmatoff 1955). In the other direction there are slight similarities between Monagrillo and some of the incised pottery of the Guatemalan highland Formative period. The position of Monagrillo as just prior to 1000 B.C. (Fig. 4) depends upon these rather slender threads; however, in view of the early Cerro Mangote radiocarbon date, and the cultural continuity between Cerro Mangote and Monagrillo, the available radiocarbon reading on Monagrillo seems much too late.

My placement of Santa María (Willey and Stoddard 1954), in the Panamanian column,

is based upon what we know of the stratigraphic position of that ceramic phase, upon my belief that it probably represents the earliest painted pottery horizon in Panama and may therefore correlate with the early painted pottery horizon of northern Colombia (Mompós, Loma, Horno, and so on, see Figs. 4, 5), and upon a radiocarbon date in the neighborhood of A.D. 200 for painted pottery from Venado Beach, Canal Zone (S. K. Lothrop, personal communication, 1957). The Venado Beach pottery is not Santa María but bears some resemblances to it.

In the Costa Rica-Nicaragua column, Nicoya (Lothrop 1926; Strong 1948a) has certain resemblances in pottery vessel forms and design elements to the early Postclassic, or Plumbate horizon, pottery of Middle America. I have placed its beginnings as only slightly earlier than this.

Salvador-Honduras are conventional sequences (Longyear 1944; Strong 1948b; Canby 1951). Diagnostic Middle American Formative and Classic traits have not yet been found east and south of a Ulua River-central Salvadorean line. There are no real ties of any kind between western Salvador and Lower Central America when we drop below a Nicoya time level. In brief, line C-D breaks in the middle in much the same way that line B-C broke in southern and central Colombia.

Radiocarbon Dates Pertinent to Line C-D

The dates given below are, with 2 exceptions, Middle American. They have an important indirect bearing upon the "Maya Lowlands" column of Figure 4. Compare them with Peruvian dates, especially with reference to Formative phases of the first millennium B.C. (See Wauchope 1954 for comment in this connection.)

Valley of Mexico Formative dates:

1360 ± 250 B.C. Zacatenco I (Libby 1955, C-196)
1457 ± 250 B.C. Tlatilco site, probably Early Zacatenco associations (Libby 1955, C-199)
615 ± 200 B.C. Loma del Tepalcate (Libby 1955, C-202)
472 ± 250 B.C. Cuicuilco (Libby 1955, C-200)
484 ± 500 B.C. Core of Pyramid of Sun, Teotihuacán (Libby 1955, C-203)

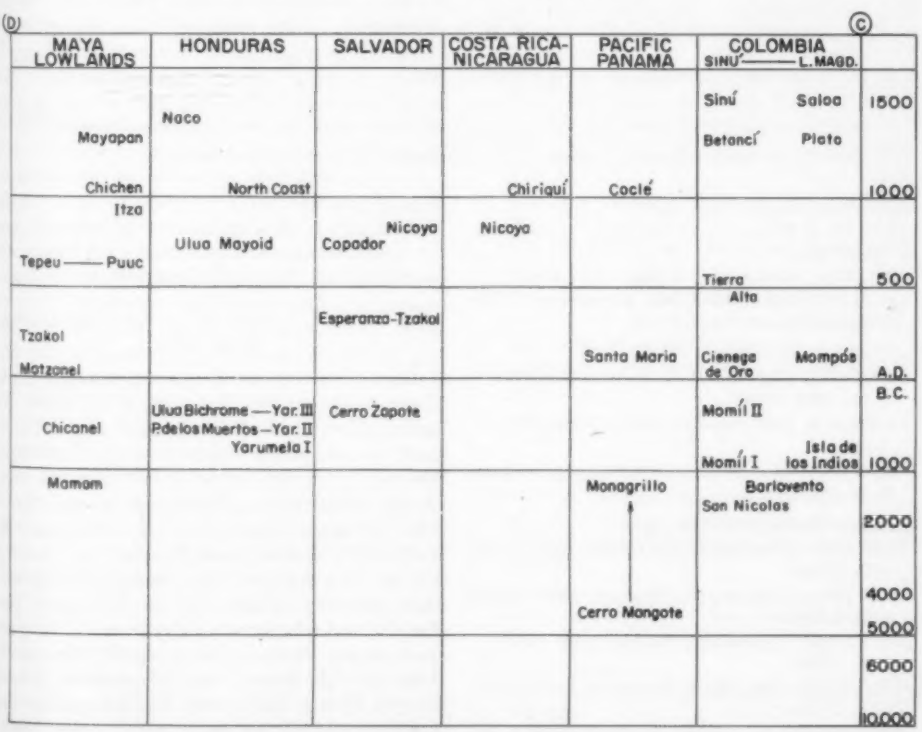

FIG. 4. Colombia-Central America (line C-D) sequence chart.

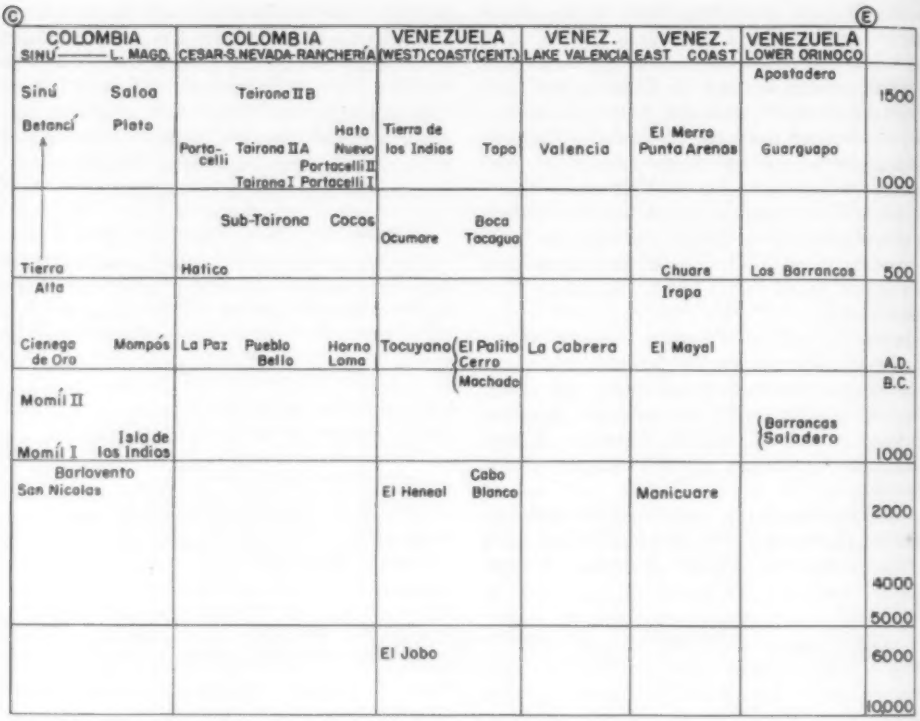

FIG. 5. Northern Colombia-Northern Venezuela (line C-E) sequence chart.

Oaxaca Formative and Classic dates:

650 ± 170 B.C. Tilantongo, Monte Albán I level (Libby 1955, C-424)

273 ± 145 B.C. Monte Albán II (Libby 1955, C-425)

A.D. 298 ± 185 Monte Albán IIIA, Chachoapan (Libby 1955, C-426)

Guatemalan Lowland Classic dates:

A.D. 429 ± 170 Tikal, Initial Series date 9.15.10.0.0. (Libby 1955, C-949)

A.D. 465 ± 120 Tikal (same as above) (Libby 1955, C-948)

A.D. 480 ± 120 Tikal (same as above) (Kulp, Feely, and Tryon 1951, L-113)

Guatemalan Highland Formative dates:

1550 ± 800 B.C. Kaminaljuyú, Las Charcas phase (Libby 1955, C-885)

1192 ± 240 B.C. Kaminaljuyú, Miraflores phase (Libby 1955, C-884)

1020 ± 200 B.C. Kaminaljuyú, Majadas phase (Libby 1955, C-886)

1200 ± 300 B.C. Kaminaljuyú, Providencia phase (Libby 1955, C-879)

540 ± 300 B.C. Kaminaljuyú, Miraflores phase (Libby 1955, C-887)

Panama dates:

4853 ± 100 B.C. Cerro Mangote (C. R. McGimsey, personal communication, 1957; test by Yale Laboratory)

A.D. 1150 ± 250 Monagrillo (Crane 1955, M-11)

NORTHERN COLOMBIA-NORTHERN VENEZUELA (Line C-E)

Point C serves as the pivot, again, for the chart of line C-E (Fig. 5). The Sinú and Lower Magdalena River sequences of Caribbean Colombia are attached to the Río César, Sierra Nevada de Santa Marta, and Río Ranchería sequences (Reichel-Dolmatoff 1954, 1957; personal communication, 1957; see also Reichel-Dolmatoff and Dussán de Reichel 1951). The San Nicolas phase is preceramic and probably relates to El Heneal, Cabo Blanco, and Manicuare in Venezuela. Its position on the chart is based upon radiocarbon dates for El Heneal and Manicuare. Loma, Horno, Pueblo Bello, and La Paz are on the earliest painted pottery horizon. As noted, these relate to Mompós, in one direction, and

to Tocuyano in the other. Both Tocuyano and Cerro Machado have radiocarbon dates in accordance with their chart positions. Higher up in the time scale there are close stylistic connections in pottery between Portacelli and Tierra de los Indios. These phases can be linked to the west and to the east, as indicated on the chart, and there are radiocarbon dates on eastern Venezuelan late cultures which confirm the general time position.

El Jobo (Cruxent and Rouse 1956), the presumed early lithic complex of western Venezuela, has typological affinities to the post-fluted-point horizon of western North America and to Ayampitín of Argentina (Rouse and Cruxent 1957). The guess-date of 6000 B.C. is in accord with both of these relationships.

The important column on the Lower Orinoco is well-anchored in radiocarbon dating. Saladero and Barrancas (formerly Barrancas 1 and 2 phases) appear to be the earliest known manifestations of 2 quite different ceramic traditions or series. Saladero features white-on-red decoration while Barrancas is a broad-line incised and modeled style. Originally, Rouse (1953, see also bibliography to this title) placed Saladero as entirely earlier than Barrancas, but a large series of radiocarbon dates indicate their contemporaneity as shown on the chart. This is discussed in the forthcoming monograph, by Cruxent and Rouse, on the archaeology of Venezuela (to be published by the Pan-American Union). Several radiocarbon dates, in addition to the ones listed in this present article, bolster the case for contemporaneity between Saladero and Barrancas (Rouse, personal communication, 1957). Both the white-on-red and the modeled-incised traditions seem to carry on for several hundreds of years following their first appearance. El Mayal, dated at about A.D. 200 by radiocarbon, is essentially Saladero-like in its pottery while Los Barrancos (formerly Barrancas 3) and Guarguapo (formerly Barrancas 4) phases are Barrancas-like. Radiocarbon dates on Irapa and Chuare give further substantiation to the chart.

Rapidly accumulating new information and the interpretations and codifications of it make it difficult for the nonspecialist in the Colombian and Venezuelan areas to relate these newer sequence formulations to existing literature (see Reichel-Dolmatoff 1954, 1957; Osgood and Howard 1943; Howard 1943; Kidder 1944, 1948; Cruxent 1951; Rouse 1953). In an attempt to help in this regard I have indicated changes in the Lower Orinoco chronology in the preceding paragraph. Farther west, La Cabrera and Valencia may be readily identified (Kidder 1944). Tierra de los Indios refers to material from near Quibor, in the State of Lara (Osgood and Howard 1943), and most of the painted pottery of tripod and pedestal-based forms now illustrated from northwestern Venezuela fits on this horizon. The earlier painted pottery of Tocuyano and related phases, which is probably ancestral to the later, will not be well illustrated until the Cruxent and Rouse monograph appears.

RADIOCARBON DATES PERTINENT TO LINE C-E

Manicuare and El Heneal dates:
- 1620±130 B.C. (Barendsen, Deevey, and Gralenski 1957, Y-295)
- 1100± 80 B.C. (Barendsen, Deevey, and Gralenski 1957, Y-296g)
- 1444±120 B.C. (El Heneal; Rouse, personal communication, 1957; Yale Laboratory)

Saladero phase dates:
- 910±130 B.C., 930±130 B.C., and 570±140 B.C. (Preston, Person, and Deevey 1955, Y-42, 3 separate runs)
- 750±130 B.C. (Preston, Person, and Deevey 1955, Y-43)
- 620±130 B.C. (Preston, Person, and Deevey 1955, Y-44)

Barrancas (formerly Barrancas 1 and 2) phase dates:
- 4300±380 B.C. (Preston, Person, and Deevey 1955, Y-41)
- 950±150 B.C. (Barendsen, Deevey, and Gralenski 1957, Y-294)
- 900±120 B.C. (Preston, Person, and Deevey 1955, Y-40)

Cerro Machado and El Mayal phase dates:
- A.D. 26±70 (Cerro Machado; Rouse, personal communication, 1957; Yale Laboratory)
- A.D. 225±100 (Barendsen, Deevey, and Gralenski 1957, Y-297)

Tocuyano phase date:
- 230±300 B.C. (Crane 1955, M-257)

Irapa and Chuare phase dates:
- A.D. 370±40 (Preston, Person, and Deevey 1955, Y-290, average of 3 separate runs on an Irapa specimen)
- A.D. 595±80 (Barendsen, Deevey, and Gralenski 1957, Y-300)

Los Barrancos phase date:
- A.D. 500 (approximate) (Rouse, personal communication, 1957; Yale Laboratory)

El Morro phase dates:
- A.D. 1235±80 (Barendsen, Deevey, and Gralenski 1957, Y-298)
- A.D. 1660±70 (Barendsen, Deevey, and Gralenski 1957, Y-299)

Orinoco Delta-West Indies (Line E-F)

The profile on line E-F (Fig. 6) is a synopsis of the detailed charts and statements that have been made by Rouse over the past years (Rouse, 1947, 1948, 1951a, 1951b, 1952, 1953, personal communication 1957). Only 2 West Indian radiocarbon dates are available, from the Ortoire phase of Trinidad. This preceramic complex dates at about 800 B.C., suggesting a somewhat more recent survival of an Archaic way of life there and in the other islands than on the mainland. Both radiocarbon datings from the mainland, and glottochronological evidence on the separation of mainland and island Arawak speech (Taylor and Rouse 1955) argue for the placement of the Cedros and Cuevas phases at about A.D. 200. This, presumably, was the first agricultural-pottery making culture to be carried into the islands, and the Arawaks are believed to have been associated with the event (Rouse 1957). There is little else to say about the chart on Figure 6. The West Indian area is one of the best organized, from the standpoint of relative and interrelated regional chronologies, of any in South America. The absolute dates given are, of course, much earlier than Rouse's old estimates. More radiocarbon dates from the various phases and islands will provide an interesting check on Rouse's hypothesis of the movements of cultures and peoples through the island chain.

Radiocarbon Dates Pertinent to Line E-F
(See also those for line C-E)

Ortoire phase dates:

810 ± 130 B.C. (Preston, Person, and Deevey 1955, Y-260-2)

800 ± 130 B.C. (Preston, Person, anad Deevey 1955, Y-260-1)

Orinoco-Ucayali-Upper Madeira (Lines E-G and G-H)

The Lower, Middle, and Upper Orinoco columns (Fig. 7) follow Rouse (1953; personal communication, 1957). Camoruco is Late Ron-

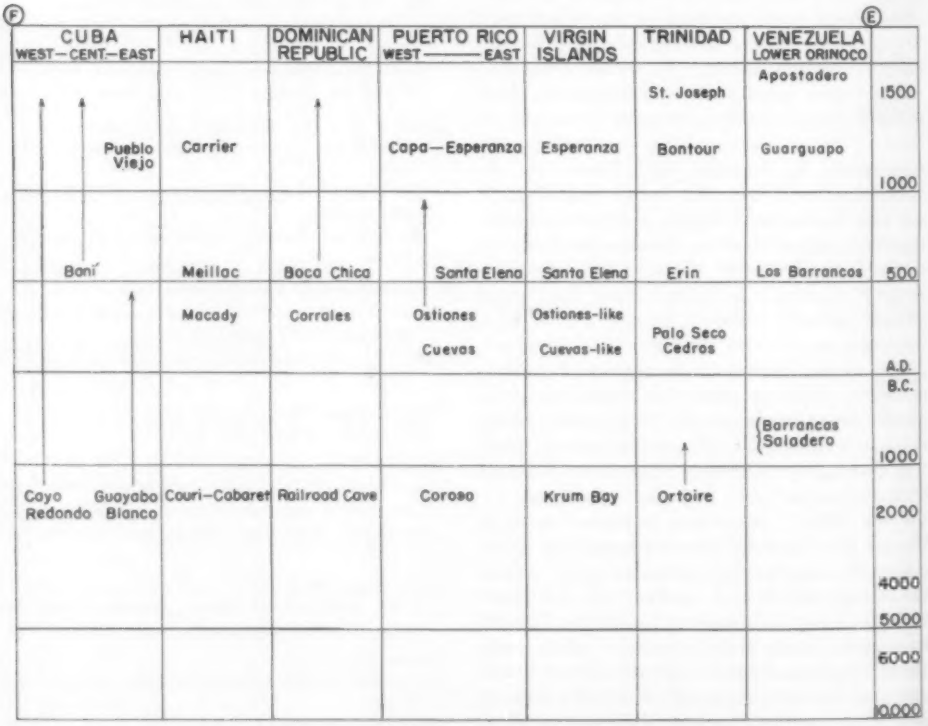

Fig. 6. Orinoco Delta-West Indies (line E-F) sequence chart.

quín (Howard 1943). Ronquín (formerly Early Ronquín) is an interesting blend of Saladero and Barrancas traits.

The Ucayali sequence is based upon recent excavations of Lathrap (1958, see this issue, pp. 379) at Yarinacocha in eastern Peru. Lathrap's earliest pottery, the Tutishcainyo, emphasizes incision, punctation, and zoned red painting. An incised jaguar on one sherd is somewhat similar to Chanapata and Pucara ceramic art in Peru, and Lathrap sees further resemblances between some of the Kotosh pottery, near Huánuco, Peru (Tello 1943) and Tutishcainyo. These similarities, plus certain vessel form features held in common between Momil and Tutishcainyo, argue for a fairly early placement of the latter. Lathrap's Shakimu phase is characterized by polished, excised wares which he sees as distantly related to the excised types of the Napo, Miracanguera, and Marajoara (see Figs. 8 and 9). Hupa-iya is a broad-line incised and modeled pottery style that has some resemblances to the Barrancas tradition. In Rouse's opinion it is most likely to follow after Los Barrancos (Barrancas 3). The sequence positions of excised and painted wares (Shakimu, Napo, Mircanguera, Marajoara) are placed to indicate a general west-to-east movement; the positions of the broad-line incised and modeled pottery complexes are arranged to suggest movement from the Lower Orinoco to the west.

Orinoco Delta-Amazon Delta-Ucayali (Lines E-I and I-G)

Going back to the Lower Orinoco datum, line E-I (Fig. 8) is run through British Guiana down to the Amazon delta (Rouse 1953; Evans and Meggers 1950; Meggers and Evans 1955, 1957). The Alaka phase of northwestern British Guiana is preceramic, but Barrancas-like influence is seen in the Palo Seco-like and Mabaruma pottery. Barrancas influences are not reported further east or south toward the Amazon delta, and the only possible tie between the Orinoco sequences and the mouth of the

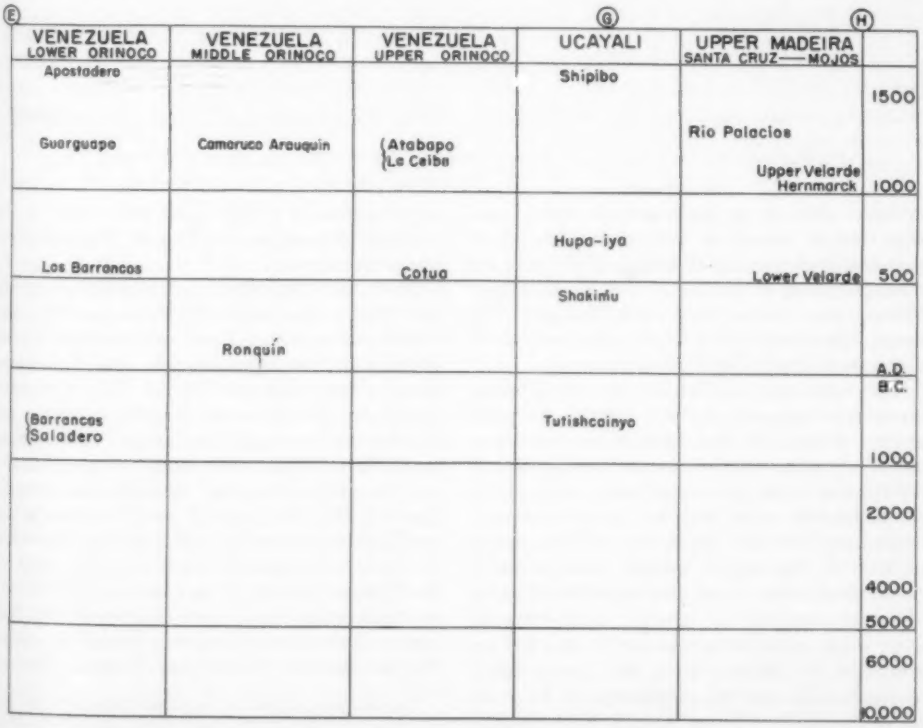

FIG. 7. Orinoco-Ucayali-Upper Madeira (lines E-G and G-H) sequence chart.

(E) VENEZUELA LOWER ORINOCO	BRIT. GUIANA	(I) AMAZON DELTA BRAZ. GUIANA ——— ISLANDS	SANTARÉM-TO-IQUITOS	(G) UCAYALI	
Apostadero		Aristé (Mazagão Maracá Arũa	Tapajó	Shipibo Cashibo	1500
Guarguapo	Mabaruma Koriabo		Paura Santarém		1000
Los Barrancos		Marajoara	Konduri	Hupa-iya	500
	Palo Seco-like	Formiga Mangueiras	Miracanguéra Rio Napo	Shakimu	A.D. B.C.
(Barrancas (Saladero	Aloka	Ananatuba		Tutishcainyo	1000
					2000
					4000
					5000
					6000
					10000

FIG. 8. Orinoco Delta-Amazon Delta-Ucayali (lines *E-I* and *I-G*) sequence chart. [See note p. 378.]

Amazon may be in the fine-lined incised pottery that is typical of Camoruca (Late Ronquín) and Arauquín (Petrullo 1939) and the Mazagão phase of Brazilian Guiana. Aristé and Maracá are contemporary with Mazagão. The latter (Nordenskiöld 1930) is known for its elaborate human effigy funerary urns.

The remainder of the Amazonian delta sequence is assigned absolute datings by guess alone. Ananatuba and Mangueiras are represented by sites which indicate small hunting-fishing and marginal agricultural communities of an Archaic type, and the pottery is simple incised and brushed ware, not relating closely to any of the better known Venezuelan or Amazonian styles. I am assuming that the idea of pottery reached the Amazon delta from the west, and, considering the early date for ceramics at the Orinoco delta, the dates assigned to Ananatuba and Mangueiras appear to me to be conservative. These phases may possibly relate to an early diffusion of incised and surface-roughened pottery that goes back to the time of Monagrillo, Barlovento, Valdivia, and pre-Cupisnique.

Marajoara represents the intrusion of Formative type culture into the Amazon delta, and Marajoara ceramics have very specific resemblances in the Miracanguera and Río Napo burial urns (Howard 1947).* The remaining phases in the Santarém-to-Iquitos column are represented by ceramic collections from a great many sites between the mouth of the Tapajós and the city of Manaos. At Santarém, proper, Easby (1952) has pointed out 2 distinct styles: one, the ornate incised and modeled Santarém; the other, an incised and modeled style of much less elaboration and with some affinities to Hupa-iya of the Ucayali and, probably, Barrancas of the Lower Orinoco. Easby has called this second style "Unrelated Ware." Norden-

* Recent excavations of Evans and Meggers on the Río Napo, in Ecuador, reveal villages filled with pottery refuse of an early Marajoara type.

skiöld (1930) mentions and illustrates it from the vicinity of Santarém, from the Río Trombetas, and elsewhere. Rydén (1937) quotes from Kurt Nimuendaju's manuscript, referring to this same "Unrelated Ware" at a number of locations between Santarém and Miracanguera. Nimuendaju's name for it was "Konduri" which I have used here. The assumption, expressed on the sequence chart (Fig. 8), is that Santarém style may be, in part, a development out of Konduri. At the same and other sites in this Middle Amazonian region is another type of pottery, the Paura, which is fine-lined incised and engraved with predominantly rectilinear design elements. Paura has some resemblances to Venezuelan Arauquin and Mazagão of Brazil.

The correlations along these lines, lacking supporting evidence of radiocarbon or other "extra-cultural" forms of dating, are highly speculative. We have seen the surprisingly long time span of certain pottery traditions such as the Barrancas and Saladero in the region of the Lower Orinoco, the Venezuelan northeast coast, and the West Indies. Such spans, of 500 to 1000 years, may be represented in some of the similarities of pottery types noted along the Amazon. These lags or continuities would, obviously, render invalid many of the equations we have made here.

Amazon Delta-Eastern Brazil-Paraná River (Lines I-J and J-K)

This chart (Fig. 9) is the least satisfactory of all. The Amazon delta column has a basis in the stratigraphy of Evans and Meggers (1950), but little in the way of related material has been disclosed in the archaeology of coastal Brazil. At the opposite end of the profile lines, a highly tentative sequence may be rationalized from the archaeological literature of the Paraná and Uruguay Rivers.

Along the coasts of Para and Maranão, south of the Amazon delta, there are pottery remains which are said to relate to the middle and later periods of the delta sequence. Lopes (1924, 1925, 1928, 1932) describes what appear to be the refuse remains of ancient pile-villages containing urns and painted pottery that he brackets with the Marajoara style. Farther south, in Bahia, red-and-black-on-white painted urns occur in shellmounds in what appear to be late, superficial contexts. These last are probably connected with late occupations, or uses, of the sambaquís still farther south. Krone (1914) and Pereira de Godoy (1952), among others, report painted pottery and burial urns from the state of Sáo Paulo. Some of these urns are of the corrugated surfaced type and are attributed to the protohistoric and historic Tupí-Guaraní.

The question of earlier pottery in the sambaquís is much less clear. I have indicated it as "sambaquís (pottery)" on the chart, suggesting an earlier occurrence in the north than in the south. Plain coarse ware is mentioned from sites in the State of Para (Ferreira Penna 1876) and either plain or simple incised and painted wares are described from the Minas Geraes caves (Walter 1948; Evans 1950; Hurt 1956). These plain or simple pottery wares appear to have been introduced into Archaic-type sambaquí or cave cultures in eastern Brazil, and the guess-dates I have selected for the introductions are estimated with reference to the appearance of early pottery at the Amazon delta and diffusion from there southward. The Archaic-type cultures of the sambaquís are frequently referred to, although only sketchily described. The entries I have made on the chart follow Serrano (1946), although he has offered no stratigraphic proof for his sequence. In Minas Geraes, a Cerca Grande phase has been referred to (Hurt 1956) as the oldest occupation of the caves and may well be the culture of Lagoa Santa man. Time estimates on Cerca Grande are relatively modest.

The leap from the vague and highly tentative Brazilian sequences to the Paraná-Uruguay regional sequence is one of the most difficult of all. In brief, we are trying to correlate East Brazilian archaeology, where there are no reliable sequences, with the Paraná-Uruguay region in which sequences are also lacking. Menghín (1955-56) refers to a forthcoming work to be published in the *Boletín de la Junta de Estudios Historicos de Misiones* (Argentina). I have not seen this, but from his reference assume that it deals with sequences, preceramic and ceramic, of a part of this region. The reader is referred to Menghín 1957 which presents opinions on various South American sequences.

The reader may note that the treatment of the Paraná-Uruguay data (Fig. 9), as well as that of the Argentine Pampas (Fig. 10), is a departure from the strictly taxonomic approach which was tried several years ago (Howard

and Willey 1947). In attempting to rationalize sequences for the Paraná-Uruguay and Pampas regions, I have followed the lead of Alan L. Bryan and Roger C. Green (personal communication, 1956). They have seriated sites, or site collections as described and illustrated in the literature, upon the absence or presence of pottery and upon the complexity of pottery decoration and form. In general, pottery is more abundant and shows greater elaboration in the north along the Paraná. Hence, sites on the Paraná lacking pottery, or possessing only pottery of relatively simple types, are considered as earlier than those in which pottery is abundant and more developed. Pottery traits found farther south, in the Pampas or in Patagonia, are considered to occur on a later time level. This seriation may be considered as a suggestive guide for future research but is certainly nothing more than this.

Salto Grande (Serrano 1932) is on the middle Uruguay between Federación and Concordia. It is chosen as representative of a hypothetical plain, or very simple decorated, pottery phase. Brazo Largo (Gatto 1939), also in the Uruguay drainage, is a small station rich in bone tools and weapons, with some chipped and ground stone tools, and with considerable incised and punctate decorated pottery. It is the selected representative of what is considered the next link in the series. Puerto de las Tunas (Penino and Sallazzo 1927), in south central Uruguay, shows a pottery complex somewhat similar to Brazo Largo but with the addition of the linear-punctate type of decoration. Malabrigo (Frenguelli and Aparicio 1923) is representative of the Paraná River style of pottery in its florescence. Linear-punctation, zoomorphic adornos, white slipping, red-line decoration, and fingernail impressions are all a part of the Malabrigo complex. The site is in the Paraná drainage in the Argentine province of Santa Fe. Arroyo de las Conchas (Serrano 1934), in Entre Rios, Argentina, shows a similar ceramic complex with the addition of 16th century European trade goods.

(I) AMAZON DELTA	BRAZIL NORTHEAST COAST	(J) BRAZIL SOUTH COAST	BRAZIL MINAS GERAES	(K) PARANÁ & URUGUAY RIVERS	
Mazagão Arũa	Burial Urns	Guaraní Pottery	Burial Urns	Chanáí—Timbúí, etc. Arroyo las Conchas Malabrigo	1500
				Puerto de las Tunas	1000
Marajoara	Maranão Pile Villages			Brazo Largo	500
Formiga Mangueiras	Sambaquís	(Pottery)	(Pottery)	Salto Grande (Pottery)	A.D.
Ananatuba	(Pottery)	"Middle and Southern" Sambaquís			B.C.
					1000
		"Archaic" Sambaquís	Cerco Grande	Santo Lucio	2000
					4000
					5000
					6000
				Alto Paraná	10000

FIG. 9. Amazon Delta-Eastern Brazil-Paraná River (lines *I-J* and *J-K*) sequence chart.

Although the above seriation is put forward as a chronological one, it will be noted that the presumed "earlier" sites all lie slightly to the east of the 2 later ones. A counter-interpretation might be offered which would explain the differences in artifact assemblages as functions of geographical space (and possibly environment?) rather than time.

On the preceramic levels there are a number of possibilities in the Paraná-Uruguay region. Serrano (1932) describes collections which were collected from riverbank washouts at Arroyo Santa Lucia, near Monte Caseros in the province of Corrientes, Argentina. These consist of pebble and core tools, flaked by percussion, and include cobble choppers, scrapers, and knives. In addition, stemmed projectile points were picked up, as were grooved bolas stones and a few other ground stone objects. A very few potsherds were found but not described. There is, at least, reasonable doubt that all of this stone material had ceramic associations. In general, the chipped and ground stone materials are similar to those found with pottery. Santa Lucia is entered on the chart as a putative preceramic, Archaic-type phase, representative of the hypothetical period in this region antecedent to the introduction of pottery. Postulated as still farther back in time is the Alto Paraná complex, formulated by Menghín (1955-56) and incorporating data of his own from sites in Misiones, Argentina with earlier findings of Mayntzhusen (1928) from near Puerto Yaguarazapa in Paraguay. Percussion chipped hand axes, picks, and scrapers are the principal tools. They are reported as being found in red soils underlying the humus and without ceramic or ground stone tool associations. I make no attempt here to evaluate critically this or other chipped stone complexes for which considerable age is claimed. As described and illustrated the Alto Paraná material does not appear radically different from the Santa Lucia complex nor the stonework found with the pottery associations. This, in itself, is no strong argument against antiquity, how-

(K) PARANÁ & URUGUAY RIVERS	PLATE DELTA	PAMPAS NORTH	PAMPAS SOUTH	PATAGONIA	TIERRA del FUEGO MAGELLANIC	TIERRA del FUEGO BEAGLE	(L)
Chaná Timbú.etc. Arroyo las Conchas	Guaraní Arroyo Malo	Querandí	Puelche	Tehuelche	Tehuelche (Pottery)		1500
Malabrigo	Arroyo Sarandí	Arroyo Frias	Hucal	Tehuelchense 3			
Puerto de las Tunas	El Cerrillo	Matanzas	Cem. de Los Indios	Tehuelchense 2 (Pottery)	Bird Per.5		1000
Brazo Largo	(Pottery?)	(Pottery?)					500
Salto Grande (Pottery)		Litoral / Garcia	Gama			Pit House Culture	A.D. B.C.
							1000
Santa Lucia				Tehuelchense I	Shell Knife Culture		2000
					Bird Per.4		
		Lanceolate Points		Proto-Tehuelchense	Bird Per.3		4000
							5000
			Tandilense		Bird Per.2		6000
Alto Paraná				Toldense I Solanense Oliviense	Bird Per.1		10,000

FIG. 10. Paraná River-Tierra del Fuego (line K-L) sequence chart.

ever; a percussion flaking industry could well have had great age and long persistence in the region.

To shift, again, to the late ranges of the time chart, there is one evident tie between the Paraná and Eastern Brazil. This is seen in the large burial urns, corrugated or decorated with polychrome geometric bands. Ambrosetti (1895), Schmidt (1934), and others report these from burial fields in southeastern Paraguay where they are identified with the Guaraní Indians. These late urn burials are not accommodated in the Paraná-Uruguay column on Figure 9 but appear in Figure 10 as "Arroyo Malo" and "Guaraní" in the Plate delta column.

Paraná River-Tierra del Fuego (Line K-L)

South from the Paraná River, through the Plate delta, the Pampas, Patagonia, and down to Tierra del Fuego, there are numerous similarities in both ceramics and stone implements. Accordingly, a series of correlations can be effected (Fig. 10). The difficulty is that there is, with few exceptions, little stratigraphic proof of sequence or chronology at any one point.

In the Plate delta column, El Cerrillo, Arroyo Sarandí, and Arroyo Malo (Lothrop 1932) are given their chronological ordering on the basis of pottery decoration and elaboration. El Cerrillo has unslipped tan or brown ware decorated with incision and linear-punctation. Similarities to the incised and linear-punctated pottery of the Paraná River are obvious although such ornamental features as the zoomorphic adornos are lacking. There is no painted treatment. Arroyo Sarandí continues with the Paraná River tradition of linear punctation but, in addition, has red banded and zoned red decorated pottery as well as red and white-slipped ware. Arroyo Malo, which is a European contact site, has Guaraní type urn burials, corrugated and fingernail-impressed ware, and polychrome decoration.

In the Pampas Menghín and Bórmida (1950) make claims for an early lithic industry from the Tandilia caves. Their estimates on this, taken from paleoclimatological dating, are around 7000 to 5000 B.C. This Tandilense complex is equated with Bird's Magellanic Period 2 (Bird 1938, 1946). Extrapolating from Bird's Magellanic Period 3, I have postulated a Pampean horizon upon the presence of long lanceolate projectile points in surface collections from the Buenos Aires coast (Holmes 1912; Outes 1909; Aparicio 1932). The Litoral (northern coastal) (Outes 1909), Garcia (northern inland) (Bonaparte and Pisano 1950) and Gama (southern) (Daguere 1934) phases are formulated as relatively late, preceramic entities. They all have stemmed triangular points, similar to Bird's Magellanic Period 4. Bolas and other ground stone implements are common.

Río Matanzas (Villegas Basavilbaso 1937) is used as a phase name under which to subsume sites of the northern Pampas that are characterized by plain, incised, and linear-punctated pottery. The equation is made with El Cerrillo. Cementario de los Indios (Torres 1922), in the south Pampas, has incised and punctated pottery but no painting, and it is placed on the same date line. Paradero Arroyo Frias (Ameghino 1915) and Hucal (Outes 1904) show mixtures of linear-punctated and red painted pottery types.

The Patagonian column follows Menghín (1952b), and the Tierra del Fuego column, both Magellanic and Beagle Channel, is after Bird (1938, 1946). Bird's Magellanic Period 1 is dated by radiocarbon at about 7000 B.C. The long, straight-stemmed projectile points of the Bird Period 1 relate to Menghín's Toldense 1 phase, near the Deseado River. Antecedent to Toldense 1 are Menghín's Solanense and Oliviense complexes. These last are from shell refuse deposits on old marine terraces in the region of Comodoro Rivadavia and the Bahia Solano. Datings are geological estimates. Solanense artifacts include points with rounded or rounded-asymmetric bases; Oliviense, which is placed at 9000 B.C. or earlier, is a flake and scraper assemblage. Proto-Tehuelchense seems to relate, on lanceolate projectiles forms, to both Bird's Period 3 and to Ayampitín (see Fig. 12) of the Córdoba highlands (Gonzalez 1952). The remainder of the Patagonian sequence parallels the flint forms of Bird's sequence, and in its pottery phases ties to the Pampas. Tehuelchense 1 and Bird's Period 4 are, presumably, coexistent. This is also the same general time span of the Litoral, Garcia, and Gama complexes which, perhaps, could be set back several centuries to correspond to the beginnings of Bird Period 4 and Tehuelchense 1. In the far south, pottery comes in only in

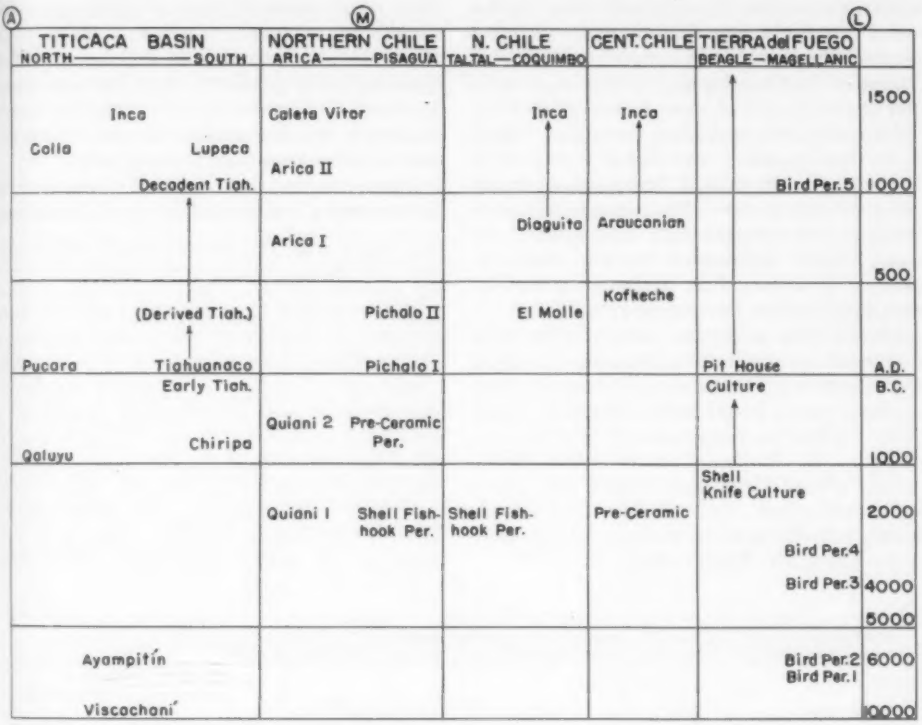

FIG. 11. Tierra del Fuego-Northern Chile-Bolivia (lines *L-M* and *M-A*) sequence chart.

historic times and is found on the mainland side of the Straits rather than on Tierra del Fuego proper.

Although not indicated on the chart, Vignati's (1927) Period A, at Río Chico in eastern Tierra del Fuego, has its most likely correlation at Bird's Period 2 level. Period C, Río Chico most likely corresponds to Bird Period 3.

The 2-period Beagle Channel sequence (Bird 1938, 1946) is placed as it is in order to cross-date the earlier "Shell-Knife," or Alacaluf-type, culture to Bird's Period 4 with its large bolas stones and small hafted scrapers. As Bird (1946: 21) notes, this "Shell-Knife" culture "evolved with slight change into the modern *Alacaluf* in the territory between the Strait and the Gulf of Peñas." The second Beagle Channel period, the "Pit House" culture, is proto-Yahgan and Yahgan. Age estimates, based upon rising shore lines, set the beginnings of the period at no later than 1800 years ago.

RADIOCARBON DATES PERTINENT TO LINE K-L

Fuegian date:

6689 ± 450 B.C. Palli Aike Cave, Bird's Period 1. (Libby 1955, C-485)

TIERRA DEL FUEGO-NORTHERN CHILE-BOLIVIA (Lines L-M and M-A)

Nothing in northern Chile seems to correspond to the earlier lithic complexes of Tierra del Fuego (Fig. 11). The preceramic complexes of the north Chilean coast have little specifically in common with the far south. The intercalation of Arica, Pisagua, and Taltal follows Bird (1943). The correlation of northern Chile with the Bolivian highlands, and the Peru-Bolivian sequences, rests on relatively little substantial evidence. I have set what appears to be the earliest Chilean pottery, Pichalo I, at the B.C.-A.D. line. If early Pichalo pottery has remote relationships with the pre-Chavín horizon plain pottery of the Peruvian coast, or with later Chavínoid materials, this

placement assumes considerable time lag between Peru and Chile. The north Chilean preceramic phases are set to come up to the beginning of the Christian era, 1000 or more years later than the end of the preceramic in Peru. Perhaps this estimated lag is excessive. Higher up in the sequence, the Arica I position is assigned upon the basis of Tiahuanacoid sherds found in that context. My estimate for cross-dating is somewhere in the long interval between Classic Tiahuanaco and Decadent Tiahuanaco, or about where we have set the Tiahuanacoid horizon for most of Peru.

Around Coquimbo, the cultural phase that is referred to as Chilean Diaguita (Latcham 1928; Cornely 1951) has good Tiahuanacoid resemblances and, by all rights, should be somewhere within the time range of Derived Tiahuanaco. El Molle (Cornely 1940, 1953), another phase in the same region, has a predominantly plain ware tradition which, although not the same as Pichalo I or II, may have some remote relationships.

In the Central Valley of Chile there are suggestions of preceramic levels (Bird 1938, 1943). The Kofkeche period of Bullock (1955), featuring urns, generally plain but sometimes decorated with red and white painting, seems to precede the Araucanian period. Of the last there is little known archaeologically.

Throughout north and central Chile the Inca horizon sets a late prehistoric cross-dating line.

Northern Chile-Northwestern Argentina-Paraná River (Line M-K)

In an attempt to relate the north Chilean cultures to their neighboring and somewhat similar cultural phases in the Argentine north, I have run a line from Arica across the Andes and down through northwestern Argentina to the Paraná sequence (Fig. 12). Inland in northern Chile the oases of the Río Loa were occupied contemporaneously with the Arica I and II farmers of the coast (Latcham 1936a, 1938a; Rydén 1944; Bennett 1946b). There is no evidence of an earlier occupation. The Ata-

(M) NORTHERN CHILE ARICA — PISAGUA	N. CHILE RÍO LOA	N.WEST ARGENTINA NORTH-CENTER-SOUTH	SANTIAGO del ESTERO	CÓRDOBA HIGHLANDS	PARANÁ-URUGUAY RIVERS (K)	
Coleta Vitor	Inca	Inca	Inca-Derived	Comechingón	Chaná — Timbú, etc. Arroyo las Conchas	1500
Arica II		Trans-Humahuaca — Aimogasta	Represas		Malabrigo Puerto de las Tunas	1000
Arica I	Atacameño	Middle-Calchaquí — Belén	Marías (Averías L. Mauca	Ongamira I Ongamira II (Pottery)	Brazo Largo	500
Pichalo II		Candelaria-Barreales	Bistín		Salto Grande (Pottery)	A.D.
Pichalo I				Ongamira III		B.C.
Quiani 2 Pre-Cer. Per.						1000
Quiani 1 Shell Fish-hook Per.				Ongamira IV	Santa Lucia	2000
						4000
						5000
				Ayampitín	Alto Paraná	6000
						10,000

Fig. 12. Northern Chile-Northwestern Argentina-Paraná River (line M-K) sequence chart.

cameño culture of these Río Loa cases shares many traits with the Middle and Late (Humahuaca) periods of an inferred sequence in the northern section of northwestern Argentina. An Inca overlay is present in both cases. A detailed sequence formulation and correlation of the north, central, south, and east sections of northwestern Argentina has already been advanced (Bennett, Bleiler, and Sommer 1948), and the general sequence which I offer in these columns is a summary of this. A revision and refinement of the sequence of the southern section is based upon recent studies by Rex Gonzalez (1955). Gonzalez's Aguada and Ciénega phases would be subsumed in my chart under Barreales. He has also subdivided what Bennett and associates (1948) have called Belén and Aimogasta. The early pottery types, Candelaria, Barreales, and Bislín, are all essentially monochrome and feature incised decoration. I have equated these with the end of the plain pottery Pichalo phases of Chile.

The Córdoba-San Luis highlands, which form an intermediate zone between Andean cultures and those of the Paraná and Pampas, have a sequence beginning with Ayampitín. Ayampitín type projectile points have also been found in various regions of northwestern Argentina as well (Gonzales 1955). The Córdoba sequence continues through the Ongamira IV and III phases, which are nonceramic and almost certainly hunting-gathering, into the pottery-bearing, small projectile point levels of Ongamira II and II (Menghín and Gonzalez 1954). These later phases are in many ways prototypical to Comechingón culture and are, possibly, agricultural. I have speculated that this ceramic introduction might have been from the northwest and have so placed Ongamira II as somewhat later than Bislín.

RADIOCARBON DATES PERTINENT TO LINE M-K

San Luis date:

6020 ± 100 B.C. Ayampitín level at Intihuasi Cave (Barendsen, Deevey, and Gralenski 1957, Y-228)

(A) TITICACA BASIN NORTH——SOUTH	U. MADEIRA ARANI	U. MADEIRA COCHABAMBA	U. MADEIRA MIZQUE	UPPER MADEIRA SANTA CRUZ—MOJOS	(H)
Inca Colla Lupaca Decadent Tiah.	Inca Ruin Arani III Arani II	Sipisipi Tiquipaya	Incallacta Holquin	Rio Palacios Upper Velarde Hernmarck	1500 1000
				Lower Velarde	500
(Derived Tiah.) Pucara Tiahuanaco Early Tiah.	Arani I	Cochabamba Tiah.	Perereta		A.D. B.C.
Chiripa Qaluyu					1000
					2000 4000 5000
Ayampitín Viscachani					6000 10000

FIG. 13. Bolivia-Upper Madeira (line A-H) sequence chart.

Bolivia-Upper Madeira (Line A-H)

This profile (Fig. 13) is a synopsis of the one offered by Bennett (1936) in which he attempted to correlate the Bolivian altiplano with his own Bolivian lowland excavations and with the earlier work of Nordenskiöld (1913, 1917). There is virtually no new information here. My chart omits several phases which Bennett enters, and it should be compared to his diagram (1936: 412) and to Howard's summary (1947: 74). The key correlation is the Derived Tiahuanaco-Arani I-Cochabamba Tiahuanaco line and the continuance of this horizon eastward to Lower Velarde.

Observations

This review reveals the difficulties in attempting correlations of archaeological culture sequences across major area lines in South and Central America. Many of these difficulties are simply due to the lack of "extra-cultural" dates, that is, radiocarbon, geological, or calendrical. Other complications derive from the lack of adequate local and regional sequences within single areas and of the synthesizing of these. Only in Peru-Bolivia and the West Indies are there sufficient numbers of well-tested regional sequences. In Venezuela, Colombia, Ecuador, the Amazon delta, parts of northwestern Argentina and north Chile, and Tierra del Fuego sequence work has been begun, and in some of these areas there is great promise for the future. For large parts of Brazil, southern South America, and lower Central America archaeological sequences are lacking or only partially outlined.

I would single out the recent field work in Ecuador, Colombia, Venezuela, and parts of the Amazon as producing the most exciting results of the last decade. Ties with Middle America and Peru are seen in the North Andean sequences, and there are now opportunities to relate Andean cultures eastward along the Caribbean and down the Amazon. It seems fairly certain now that agricultural village life and pottery making was established in the eastern lowlands as early as the beginning of the first millennium B.C.

A number of interesting speculations come to mind in a review of these charts. First, evidence is slowly accumulating to support the view that agriculture-based societies from southern Middle America to Peru were linked very definitely by common participation in ceramic and other traditions as early as 1000 to 500 B.C. This evidence continues to suggest that the main currents of diffusion flowed from north to south. As a corollary of this there is also the suggestion of the diffusion of early pottery-making ideas antedating 1000 B.C. and, probably, antedating maize agriculture. Monagrillo, Barlovento, Valdivia, pre-Cupisnique, and, perhaps, Barrancas and Ananatuba-Mangueiras are the possible cultures involved. All appear to have had a fishing-gathering mode of subsistence, probably supplemented in some cases by farming. Rouse (personal communication, 1956), following Sauer's lead (1952) has postulated a possible premaize root-crop horticulture developing in lowland South America. It may be, that in some localities, manioc farming had its beginnings on this time level. Another observation is that early ceramic cultures were well established in the tropical Montaña of eastern Ecuador and Peru, that these cultures were related to those of the adjacent Andes, and that they were the sources for diffusions which spread from there to the east.

A summary of the problems and questions raised by this kind of rapid survey would run many times longer than all that I have said so far. I can only end on the hope that whoever undertakes the next such task of correlations will draw upon much new evidence from many places.

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HARVARD UNIVERSITY
Cambridge, Mass.
September, 1957

AUTHOR'S NOTE: While this article was in press my attention was called to Hilbert's recent publication (1955) on the archaeology of the Santarém and Miracanguera region of the Amazon. I have not yet had access to this report.

Datings of the earlier Amazonian Delta phases shown in Figure 8 are somewhat earlier than those estimated by Meggers and Evans (personal communication, August, 1957).

For the Cochabamba column of Figure 13 Rydén (1952) has reported Classic Tiahuanaco graves at Tupuraya; he also postulates a Chullpa Pampa phase as being antecedent to Classic Tiahuanaco in the Cochabamba region. For more recent writings on Bolivian archaeology, which I have been able to consult only after this article went to press, see Ibarra Grasso (1956a, 1956b) and Ponce Sangines (1957).

THE CULTURAL SEQUENCE AT YARINACOCHA, EASTERN PERU *

DONALD W. LATHRAP

DURING May, June, July, and August of 1956 I was engaged in archaeological field work near the city of Pucallpa on the Ucayali River in eastern Peru. The project was sponsored by the American Museum of Natural History as a part of its long term program of anthropological work in the Peruvian Montaña. The Museum grants permission to present this preliminary statement, and it will publish the final report on this work.

The middle and lower sections of the valley of the Ucayali River, though not far east of the Andean highlands of Peru, are within the Tropical Forest Region of the Amazon Basin and are at an elevation of less than 500 feet above sea level. At the point where it passes Pucallpa, the Ucayali is already a monstrous river whose course is characterized by a low gradient and numerous meanders. This course frequently changes and leaves in its wake countless swamps, sloughs, and oxbow lakes. Yarinacocha is a typical oxbow lake located a few miles to the northwest of Pucallpa. At certain places along the lake shore there are clearings marking the sites of Indian and Peruvian fields, but for most of its length the lake is lined by dense jungle rising in a green wall to as high as 200 feet. The quantity and variety of fish within the lake is truly remarkable and the lake is a major source of food not only for the inhabitants of its immediate banks but also for the people of Pucallpa.

The present Shipibo village of San Francisco de Yarinacocha stands at the north end of the lake. In 1925 Günter Tessmann spent 2 months here doing ethnographic work. In the course of his studies he made a small collection of sherds which were of types obviously different from those made by the modern Shipibo. He illustrated some of these sherds in his book *Menschen ohne Gott*, but at that time not enough was known about the archaeology of Lowland South America for the true importance of this material to be recognized (Tessman 1928: 26). NOT ENOUGH IS KNOWN NOW

More recently the late Harry Tschopik, Jr., spent some time here in 1953, in the course of an ethnographic reconnaissance of the Ucayali drainage. He also made a small, surface collection of non-Shipibo sherds and recognized the possible importance of the locality as an archaeological site. It was on his recommendation that the Department of Anthropology of the American Museum of Natural History undertook to sponsor archaeological work at this spot. TO JUSTIFY WASTING THIS PAPER

I lived in the Indian village of San Francisco de Yarinacocha and hired a crew of Shipibo as workmen. My time in the village was spent in midden excavation in the hope of recovering stratigraphic evidence for a sequence of ceramic types. Excavations were conducted in 2 localities only. One of these was the high ground around the schoolhouse. This area is the nucleus of the modern Shipibo village. My workmen suggested Hupa-iya as the best name for this particular locality and so it was applied both to the site and to the most prominent archaeological complex there. This was the spot where both Tessmann and Tschopik made their collections.

The other place was a slightly lower knoll about a mile and a half to the northwest and at a considerable distance back in the jungle from the shore of the modern lake. This knoll stands beside a slough which the Shipibo called Tutishcainyo and that name has been applied both to the site and to its most important archaeological complex.

Surface collections were made at 3 other sites, all of which yielded the ceramic complex which has been called Pacacocha.

The Ceramic Sequence. The following remarks are of a tentative nature as two-thirds of the collections were still in transit from Peru at the time this paper was written. These comments are based on a fairly thorough analysis of the part of the collection which had arrived, the major part of the collections from the Tutishcainyo site, and on a preliminary analysis in the field of the most productive strati-

* This article is an expanded version of a paper read before the annual meeting of the Society for American Archaeology, Madison, Wisconsin, on May 3, 1957. I wish to thank Gordon R. Willey who read and criticized the original version and Robert J. Squier who read and criticized the present version. Their suggestions have been most constructive and helpful.

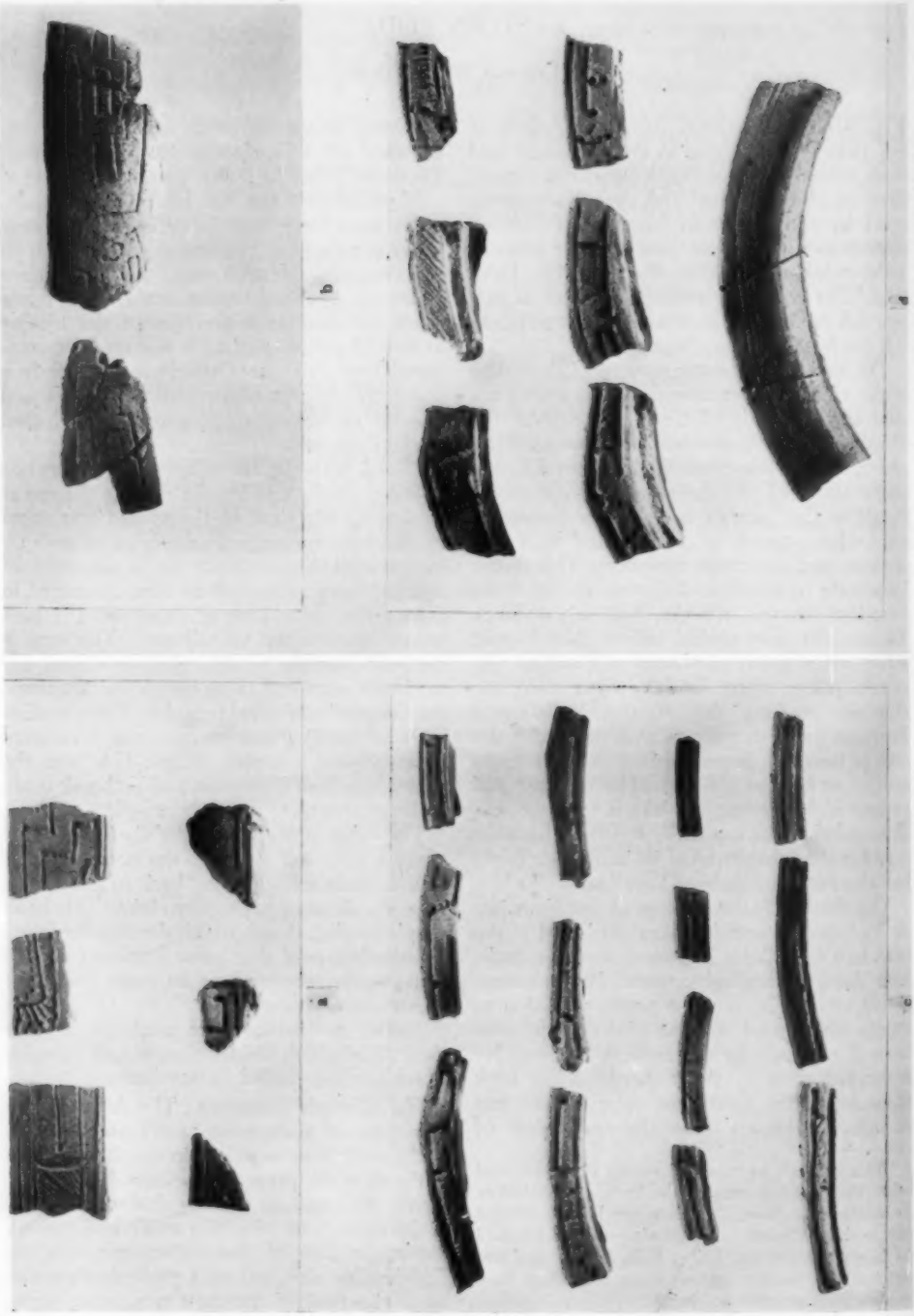


Fig. 1. Early Tchefuncta pottery: a, body sherds; b, fragments of bowl with ear heads; c, typical rims; d, typical decorated basal flanges.

FIG. 1. Early Tutishcainyo pottery. *a*, body sherds; *b*, fragments of bowl with cat head; *c*, typical rims; *d*, typical decorated basal flanges.

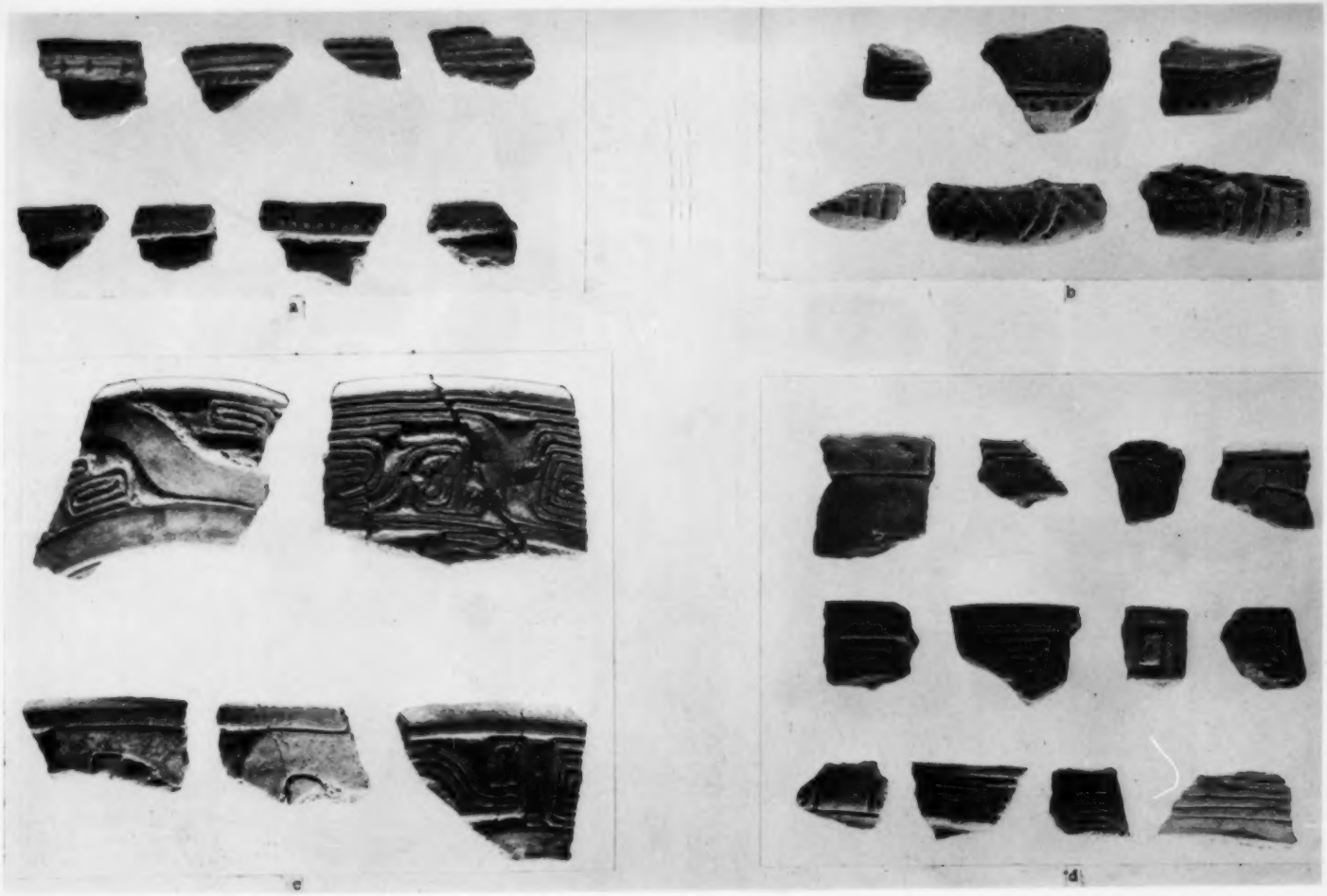
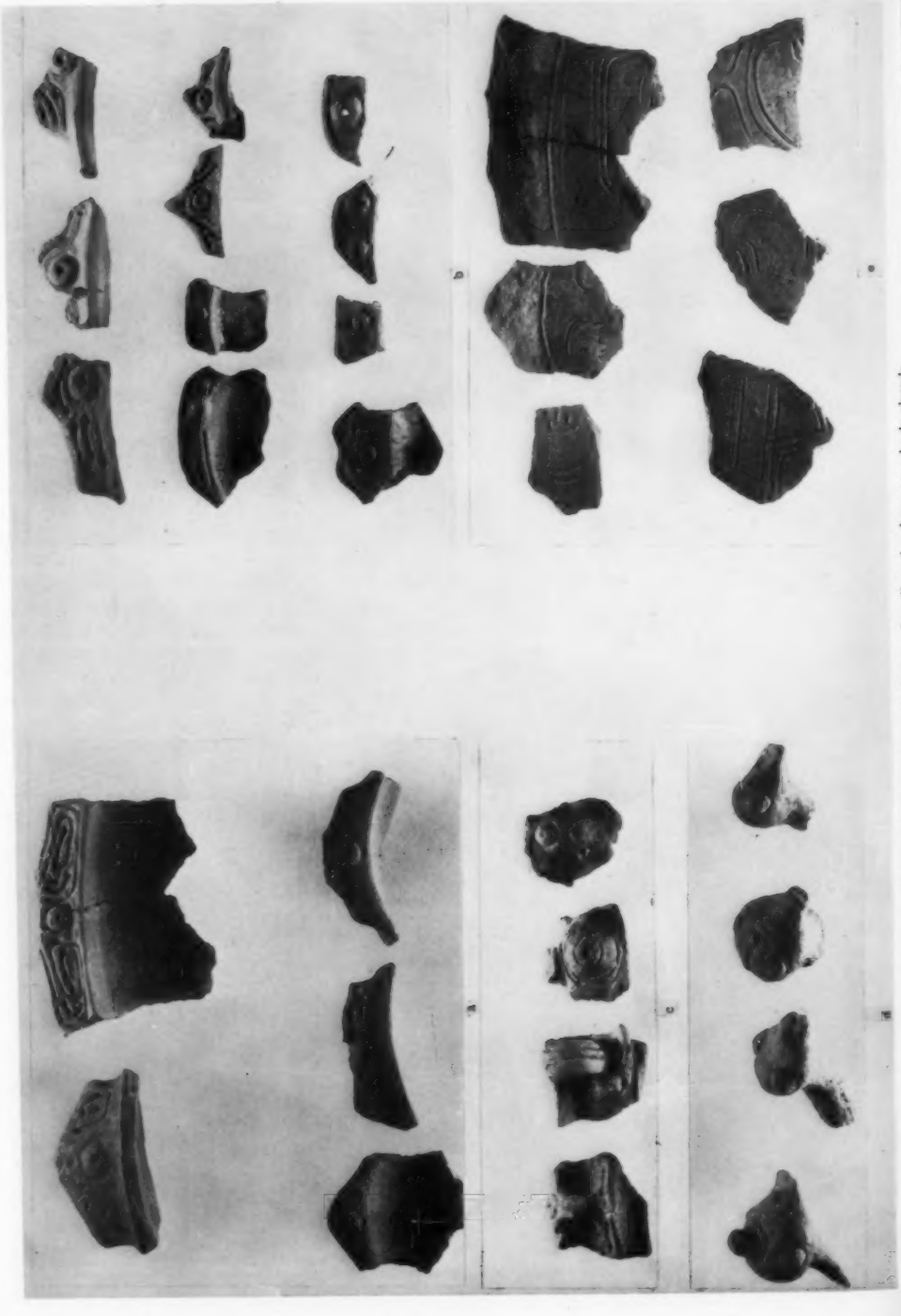


FIG. 2. *a* and *b*, Late Tutishcainyo pottery: *a*, typical rims; *b*, typical basal angles. *c* and *d*, Shakimu Excised pottery: rim and body sherds.



graphic excavation at the Hupa-iya site. The biggest drawback in writing up this preliminary paper was the impossibility of comparing these 2 parts of the collection.

The only type of evidence used in constructing the sequence now to be presented is stratigraphic evidence, that is, the direct superposition of one pottery complex over another. The sequences at the 2 sites are not identical and the problem of their alignment can best be visualized when the 2 sequences are presented in tabular form.

TUTISHCAINYO SITE	HUPA-IYA SITE
Modern Shipibo (only traces)	*Modern Shipibo*
Thick, coarse, dark ware	
Pacacocha (only traces)	Pacacocha
Yarinacocha	*Hupa-iya*
Late Tutishcainyo	*Shakimu*
Early Tutishcainyo	*Early Tutishcainyo*

The italicized names represent ceramic complexes which are well represented in the cuts and the relative stratigraphic position of which seems established beyond any reasonable doubt. It can be seen that there are certain problems which are unresolvable on the basis of this statement. For instance, the temporal relationship of the Yarinacocha complex either to the Shakimu complex or to the Hupa-iya complex is not clear. It is hoped that a more thorough analysis of the material will resolve these problems but at present it is best to acknowledge their existence openly.

1. The earliest ceramic complex at both sites, Tutishcainyo, may represent the oldest ceramic assemblage in this area but we can not be sure at present. At least 2 periods can be distinguished within this group of ceramics on the basis of certain modes of decoration. The following remarks deal specifically with *Early Tutishcainyo*; the Late variant will be treated separately. The most common vessel form is a large, relatively shallow bowl with a hemispherical base and walls which are concave, straight, or composite in profile. The break between the sides and base is sharply marked, in some instances by a simple ridge but more frequently by a broad horizontal flange. The typical rim is expanded outward in a broad, horizontal extension.

Decorated ware was the rule rather than the exception. Decoration was by incision and involved a variety of step-fret and step-scroll motives. Zoning was the basic concept in almost all of the design layouts. Areas of the pot's surface were demarcated by fairly deep incisions and these zones were textured by one of several techniques, including hatched shallow incision, crosshatched shallow incision, punctation, reed punctation, and occasionally zoned red painting. Frequently the incisions of such decoration were filled with a dry red pigment. Such decoration occurs on one or more of 3 zones of the vessel: on the flat upper surface of the rim, on the upper surface of the basal flange, or in a zone on the wall of the vessel.

Except where thickened at the rims and flanges, this pottery is very thin. The firing is uncontrolled and the core is typically intensely black. A significant percentage of this pottery has a heavy shell temper, while another portion is very heavily tempered with sand. The majority of the pottery has a slightly sandy paste and there is some evidence that some form of vegetable material was also added.

2. The *Late Tutishcainyo* pottery deviated from the norms described above in the following ways: the horizontally expanded rim became less frequent and was partially replaced by another form with crude, broad-line incision; the incised decoration tended to be more slovenly done and in some instances approached what might be called brushing; the flanges tended to become shorter and thicker while a specific form of notched, basal angle was diagnostic. A type of zoned decoration involving parallel rows of dots is confined to the Late period of Tutishcainyo. It seems highly probable that this type of texturing was done with a dentate roulette. (This point was brought to my attention by Richard MacNeish.) The Late Tutishcainyo pottery tended to be thicker and more completely oxidized.

3. At the Tutishcainyo site, Late Tutishcainyo is overlaid by the *Yarinacocha* complex consisting largely of thicker, plain ware. This type of pottery is sherd tempered and was smoothed while the clay was somewhat wet, giving a floated finish. The surface of this pottery tends to be relatively free from firing clouds; the interior surface is typically a bright, even orange, while the exterior surface ranges from orange to a medium, reddish brown. Characteristic forms include large, flat-bottomed, vertical-sided urns with simple rolled rims and very large, flat, circular platters with

straight, outsloping sides about 2 inches high. The rims of these platters are absolutely plain. Associated with this plain pottery are occasional sherds with red, black, or white painted lines on an unslipped base. These painted sherds are too small to permit an adequate characterization of the designs.

4. The *Shakimu* complex, which overlies the Tutishcainyo materials at the Hupa-iya site, is defined by the presence of a highly distinctive ware with excised decoration. With the possible exception of the modern Shipibo pottery, this excised ware was the most skillfully made pottery found in the course of the excavations. At least it was the only pottery which aroused the aesthetic interest of the modern Shipibo potters. The decoration consists of highly complex scroll and step motives standing in high relief against an excised background. Such decoration typically occurs on the outside of bowls with straight or slightly concave walls, but occasionally is found on the upper surfaces of basal flanges. Another plain but very well made and highly polished ware is clearly associated with the excised ceramics.

5. The ceramic complex which has been called *Hupa-iya* has been found only at the center of the modern Shipibo village, but the refuse containing pottery of this type is both thick and widespread here suggesting a density of population and intensity of occupation not equaled before or after that period. Hupa-iya is another incised ware complex. The incision seems to have been done when the clay was still soft and the incised line tends to a broad U-shaped cross section. The designs are curvilinear and have a free-flowing quality which is more easily perceived than defined. The decorated field is more likely to be the whole outer or inner surface of a vessel rather than being confined to a narrow zone. The incised lines usually end in expanded pits. Adornos, horizontal lugs, and vertical strap handles are common features. Another peculiarity is the persistent use of small, round, appliqué pellets with a central punctation and encircling, incised groove. Typical shapes are simple, hemispherical and oval bowls, and plates with incised decoration both inside and out. The surface color is usually an even, grayish brown. The paste of this pottery frequently contains small iron concretions which are only rarely found in the paste of the earlier ceramics.

6. There seem to be at least 2 and possibly more ceramic complexes consisting almost entirely of very thick, coarse wares. One of these, the *Pacacocha* complex, occurs abundantly at the center of the modern Shipibo village and is the only ceramic complex at several other sites where only surface collections were made. While the chronological position of this complex is, as yet, not absolutely clear, the available evidence would suggest a position subsequent to Hupa-iya. Huge, flower pot shaped urns are the common form. A crude style of adorno was a rarely used decoration on the otherwise plain ware. Another ware, thick, crumbly, and blackish, was found in small quantities very near the surface of the Tutishcainyo site. This sometimes has heavy thumb print corrugation. Large pointed-bottom urns occur.

7. Many areas of the modern Shipibo village are covered with a thin but dense layer of refuse containing *Shipibo* pottery. Shipibo fine ware is thin, hard, and well fired and polished. The 2 basic color schemes used are white-on-red and red-and-black-on-white. The white slipped ware is typically coated with a layer of resin applied immediately after firing while the vessel is still hot. The shapes include huge brewing urns, water ollas, and smaller bowls and cups. The utility ware is unslipped, but always decorated with a variety of incised, corrugated, and punctate decorations whose basic motives are the same as those of the painted decoration on the fine wares. The basic form of the utility ware is a large, open mouthed, cooking pot. All Shipibo pottery is tempered by the addition of finely divided, charred, silicious bark. The general style of modern Shipibo pottery has been well illustrated elsewhere (Tessmann 1928; Steward and Métraux 1948, Pl. 52 *a*, Fig. 87 *a*; Farabee 1922, Pl. 10) so that examples have not been shown here.

Other Cultural Remains. Cultural remains other than ceramics were extremely rare in all of the excavations. In part this is due to the complete disappearance of such materials as shell and bone from all but the most recent Shipibo middens and in part it may be the result of the lack of natural stone in this flat, alluvial valley. What was found can best be reviewed briefly in terms of materials.

Ceramic artifacts other than pottery include such items as spindle whorls, "fire dogs" (pot supports), and pot polishers. Modeled spindle

whorls first appear in the Hupa-iya ceramic complex and are decorated in the same fashion as the pottery. In somewhat different forms they continue through the Pacacocha complex and are a part of the modern Shipibo ceramic complex. Perforated sherd discs which might have served as spindle whorls were found in the Early Tutishcainyo complex. Fragments of large, cylindrical "fire dogs" were recovered in association with the Pacacocha complex at the Hupa-iya site. Well-shaped ceramic pot-polishers are part of the modern Shipibo ceramic complex.

Amorphous lumps of fired clay were found in large numbers in most of the refuse excavated, but were especially large and frequent in the deposits containing Early Tutishcainyo ceramics, where they made up a large part of the volume of the midden. Such lumps may have served in various ways as stone substitutes in this completely alluvial region.

A single type of polished stone ax was recovered from all periods of the sequence. It has distinct lateral projections, or ears, and is the type of tool which in Highland and Coastal Peru has often been referred to as the "Inca ax." No other examples of standardized types of stone artifacts were recovered though there were a few flakes of cryptocrystalline rock which might have served as scrapers.

Only one bit of metal was recovered in the course of the excavations. It is a fragment of what appears to be electrum foil, found associated with Early Tutishcainyo material at the Hupa-iya site. It has been submitted for metallurgical analysis.

One burial was definitely identified as such but the bones were so far deteriorated that only traces of white, fibrous material remained. It was possible to note that it had been a primary, flexed inhumation without grave furniture but no other data could be obtained. From its position in the midden it seems most likely that it was buried at the time when the Yarinacocha complex was in use at the Tutishcainyo site.

No direct evidence of architecture was recovered but the impressions on certain clay fragments recovered in association with Early Tutishcainyo pottery suggest that wattle and daub walls may have been constructed during the earliest period of the sequence.

The Affinities of the Ucayali Ceramics. There are certain facts which should be kept in mind while reading the following remarks. This work in the Ucayali Valley was the first systematic archaeological excavation done in the Peruvian Montaña and, with the exception of Nordenskiöld's work in Lowland Bolivia, the first systematic work within the Upper Amazon Basin (Nordenskiöld 1913). It is possible that this scarcity of pertinent comparative materials has resulted in a tendency for the writer to grasp at straws.

Only the 4 ceramic complexes, which are most clearly defined and the relative chronological positions of which are firmly established, need be considered at this time. The Yarinacocha and Pacacocha wares are too lacking in distinctive features to make long-distance comparisons possible, let alone profitable. The complexes to be considered are, proceeding from earliest to latest: 1st, Tutishcainyo with its emphasis on zoned decoration; 2nd, the Shakimu complex with elaborately excised wares and well-polished plain wares; 3rd, Hupa-iya with its broad line incision and modeling; and 4th, modern Shipibo pottery with its polychrome painting.

Before suggesting what other ceramic complexes Tutishcainyo might resemble, it is well to state at the outset that it is a somewhat outré configuration of ceramic traits when compared with other known assemblages in South America. With the various Chavín horizon ceramics of highland and coastal Peru, Tutishcainyo shares an emphasis on zoned decoration of several varieties, but specific stylistic similarities are few. The one representation of a jaguar on Tutishcainyo pottery more closely resembles those of Canapata and Pucara than it does specifically Chavín renderings of this subject. There are similarities between certain Chanapata rim forms and those of Tutishcainyo (Rowe 1944, Fig. 10, *4, 7*; Fig. 11, *3*; Fig. 12, *3*). The site of Kotosh near Huánuco is the nearest truly highland site which is known archaeologically. It has produced 2 styles of pottery which are said to be contemporaneous there. One closely parallels such typical Chavín horizon wares as the Early Ancón series. The other style emphasizes zoned hatching filled with red pigment and in this respect as well as in certain design motives is similar to Tutishcainyo (Tello 1943, Pl. 19 *b*).

In the northern Andes and adjoining lowlands there are a number of features of ceramic style which resemble those found in Tutishcainyo. Such similarities are most numerous

and specific in the Momíl collections from the north coast of Colombia recently described by the Reichel-Dolmatoffs (1956). Such shared traits are most numerous in Levels 5 and 6 of the Momíl cut.

Even farther afield are resemblances which may be noted between Tutishcainyo and certain ceramics of the Middle and Late Preclassic of Lower Mesoamerica. Specifically I am thinking of the large labial and medial flanges and the zoned crosshatching which are features of Provedencia in the Guatemala highlands and the rim and vessel forms common in the polished red and Usulutan wares in the late Preclassic of Copan and the Petén. (These comments are based more on an examination of the actual type collections in storage at the Peabody Museum of Harvard University than on the relevant published materials, that is, Shook 1951; Longyear 1952; Smith 1955). Some of these Mesoamerican similarities are quite striking but there must be a great increase in our knowledge of all of the intervening areas before the probability of historical connection can be evaluated.

Of the ceramics of the Shakimu complex, only the excised wares are sufficiently distinctive to require comment at this time. In their work in the Río Napo region of Ecuador during 1956-57 Evans and Meggers found that a series of excised wares is associated with the previously known but imperfectly described pottery of this area (Howard 1947: 42-7). Evans and Meggers kindly permitted me to examine their unpublished material, but it proves to be unlike the Shakimu excised wares. Compared to Shakimu Excised the Río Napo pottery has large and rather simple designs which were executed in a careless technique. In complexity of design and care of execution, the excised series in the Marajoara phase on Marajó is closer to the Shakimu pottery than is the Río Napo material, but a detailed comparison of design elements has not yet been made between Shakimu and Marajoara. The third and most striking comparison is with further collections from the latest work of Estrada (1956) and Evans and Meggers, on the coast of Ecuador. The ceramics of the Valdivia phase which underlies the already described Chorrera phase (Evans and Meggers 1957) contain an excised series which in vessel shape, technique, care of execution, and even to a degree in design elements is markedly similar to Shakimu Excised. A full discussion of what these similarities might mean had best wait until complete descriptions of both complexes have appeared in print.

Hupa-iya shares a large number of its distinctive features with the Barrancoid materials from the Lower Orinoco Basin in Venezuela. The Barrancoid ceramics comprise a series of temporally distinct styles within a single tradition, rather than a single phase, but all of the details of this sequence have not yet been published (Rouse 1951). Rouse was kind enough to show me his type collections for the full range of the Barrancoid ceramics and it is my impression that Hupa-iya is most similar to Los Barrancos. In spite of the great geographical distances, the similarities between Hupa-iya and the Barrancoid ceramics are far closer than any of those discussed for the other complexes. There are certain ceramic styles which have been cursorily described and a number of isolated pieces which have been illustrated, which occupy a more or less intermediate position geographically and which show stylistic relationships to both of the complexes under discussion. There are, for instance, the "Unrelated Ware" of Easby (1952: 64, 67) in the area near the mouth of the Tapajos and the "Estilo Globular" of Hilbert in the area of the Río Trombetas (Hilbert 1955: 65-9).

On the basis of my work it is clear that the style of pottery now made by the Shipibo Indians did not develop in this region, but is a relatively recent introduction. The similarity of Shipibo pottery to that made by the Cocama farther down stream on the Amazon suggests that this style moved upstream from the central Amazon Basin. It has often been suggested that modern Shipibo pottery is somehow related to the polychrome style found on Marajó in the Marajoara phase (Kroeber 1949: 488; Willey 1949: 148). If there is a valid historical link between the 2 styles, it can be demonstrated only by further work in the central Amazon Basin. The work of Evans and Meggers (1950) has completely excluded Marajó as the point of origin for this polychrome tradition and my work has been equally conclusive for the Ucayali Valley in this respect.

Speculations. At the present state of knowledge concerning these materials, any broad statements about their significance must be of highly speculative nature. Nonetheless 2 such

conjectures will be offered as possible stimulants to further research.

It seems possible that the origins of the Tutishcainyo complex may be somehow related to the spread of Middle Preclassic culture from Mesoamerica into South America which has been suggested in recent works by Porter (1953), Willey (1955), Evans and Meggers (1957; 243-6), and the Reichel-Dolmatoffs (1956). But there may have been a time lag in the more distant areas of the Tropical Forest, such as in eastern Peru, so that Tutishcainyo may be of lesser antiquity than some other South American cultures which suggest Mesoamerican influences.

The other hypothesis is that the spread of modeled-incised ceramics, such as Hupa-iya, throughout much of the Amazon Basin may in part be a result of the wave of migration which spread the Arawak languages throughout many of the same areas. All of the scraps of evidence which suggest this hypothesis will not be reviewed here as I intend to follow out this possibility in a more systematic way in future publications. There is, of course, a large block of Arawak speaking peoples in the Ucayali Valley who seem to have been pushed back from the main streams by the Shipibo and other Panoan speakers.

The number and disparate nature of the ceramic complexes recovered in these rather limited excavations are perhaps the most significant features of my work in the Ucayali Valley. They indicate considerable time depth for agricultural peoples and a diversity of cultural influences acting on this area. In short, the prehistory of this part of the Upper Amazon Basin seems to have been anything but simple in its general outlines. Since it is possible, even probable, that I failed to encounter other cultural complexes which may exist in the region, the picture is likely to become even more complicated before we have a full understanding of the prehistory of the Upper Amazon Basin.

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A CHRONOLOGICAL FRAMEWORK FOR THE MOBILE BAY REGION

E. BRUCE TRICKEY

A SOUND cultural chronology is the primary step in discovering the prehistory of any region. The chronology of the northwest coast of Florida and the adjacent Mobile Bay region of Alabama was first outlined by Willey (1949), utilizing his own surface and excavated collections, as well as the extensive but unsystematic work of Clarence B. Moore. Later Ford (1952) incorporated a portion of Willey's data into a chronological comparison of the Gulf Coast region and the Lower Mississippi Valley. Recently Sears (1956), in a most thorough report on the excavations at the Kolomoki site in southern Georgia, has called certain details of the ceramic chronology developed by Willey into question; notably the time position of the abundant check-stamped ware.

The present paper will present a ceramic chronology for a restricted section of the Gulf Coast, the Mobile Bay region. This chronology, based on some stratigraphic information and on seriation of surface collections, seems to have the advantage that the geographical aspect of type frequency variation is under better control than if the sites used were scattered over a more extensive region. It also presents new information on the later portion of Gulf Coast chronology.

The Sites. Locations of the sites that have provided the collections used here are shown on the accompanying map (Fig. 1). With the exception of one site (Old Blakely) these ancient villages are concentrated in 2 somewhat different environments, on the low sandspits that forms the southern bounds of Mobile Bay, and along the lower reaches of the Tombigbee River above the head of the bay. In the first locality seafoods were available and most of the midden deposits contain oyster and clam shell. It may be significant that the river bottom sites tend to date late in the chronology. Preliminary observations indicate that the earlier sites are found on the periphery of the flood plain where they are not so exposed to

the floods and channel movements of the river system.

Douglas Mound. The so-called Douglas mound is actually a group of 3 small mounds in sight of each other on the east bank of the Tombigbee River just above the entrance to Three Rivers Lake. Although the mounds are now flattened and irregular in shape, presumably from former cultivation and periodic flooding, they probably served as substructures for dwellings.

Ginhouse Island. On the north side of Ginhouse Island in Three Rivers Lake there is a conical mound near the water about 100 feet in diameter and possibly 5 feet at its highest elevation. Borrow pits are plainly seen to the west. Superficial burials in a very poor state of preservation are exposed on the northern slope. Two pottery vessels associated with extended burials were found at this site, along with a quantity of sherds.

Strong's Bayou. Now called Shell Bank Bayou, this locally famous site was visited by Moore (1905b). It is located on the north side of the long tongue of land which forms the southeastern side of Mobile Bay. Formerly this shell mound was of much larger size, but it has been practically destroyed by storms since Moore's time. Pottery is plentiful along the beach face and in the water close by.

Dauphin Island. On the north side of Dauphin Island are located large and extensive shellheaps, which contain quantities of shell-tempered pottery. Parts of this deposit have been destroyed by recent development of the island as a summer resort, but very large deposits still are essentially untouched and would richly repay careful excavation.

Boggy Gut. This site is in dense river bottom forest about ½ mile south of the Tombigbee River and about 8¼ miles by water from McIntosh Landing. Along the side of Boggy Gut are to be seen several circular depressions about 30 feet in diameter and possibly 2 to 3 feet deep. The edge of one of these depressions produced 850 sherds from one small test pit.

Salt Creek I and II. On the road to Rockville from Jackson, Alabama, there are 2 sites on the north side of the road where it crosses Salt Creek. Salt Creek I is about 3 acres in extent surrounding several brine pools near Salt Creek. These pools were exploited extensively during the Civil War to obtain salt for the South and remains of salt furnaces, as well as pipes and troughs, are still to be seen there. Shell-tempered pottery is plentiful on the surface and for a considerable depth in some areas. Salt Creek II is located about 100 yards from Salt Creek I and is situated on a small knoll, the southern portion of which was removed during the construction of the road. This area produces sand-tempered sherds mixed with a smaller quantity of the shell-tempered types.

St. Andrews Point. Surface indications pointed to a fair sized site at this place, but it was only after several visits that a midden was located which had depth enough to show promise for stratigraphy. This midden is located on St. Andrews Point, which juts into St. Andrews Bay and is about 200 yards from the Fort Morgan highway. The midden is made up of shells and village debris and is in places about 36 inches deep. A 5-foot square pit was excavated in 6-inch levels and provides the stratigraphy shown in Figure 3.

Terry's Landing. This village site is located on the southeastern shore of Mobile Bay just east of Seymour's Bluff. It is marked by a deposit of shells containing fish bones and other occupational debris as well as pottery. Several associated sand mounds are found about ¼ mile west of the village site at Seymour's Bluff.

Horseshoe Bend. The Horseshoe Bend site is located inside the loop of a large meander of the Tombigbee River midway of the neck of the loop. It is marked by scattered shell on the surface adjacent to an old channel of the river.

Three Rivers. The Three Rivers (or Three Rivers Lake) site is situated on Three Rivers Lake, a western tributary of the Tombigbee. Four artificial mounds and 2 areas of village debris mark the locality. Moore (1905a) investigated these mounds and their present shapeless condition can in part be attributed to his work. The sketch map, Figure 2, shows the mounds, Moore's pit in Mound 3, and the limits of the 2 village areas. These limits were determined by use of a soil auger.

Collections were classified from 5 localities on this site; pits were excavated in Mounds 1, 2, 3, and 4, and a surface collection was obtained from the Sandbank area. Mound 1 was made of clean yellow sand and produced a very few small sherds. There seem to be 2 major and one minor occupation of this site, one at the Sandbank area which produced the early Bayou La Batre types, and the second, which is marked by the mounds and village site which produced the incised and rocker-stamped pottery. In addition, the burials found by Moore (1905a) with accompanying shell-tempered pots must be counted as a third occupation. Our examination of the site leads us to believe that these burials were probably intrusive into the mounds built by the earlier people.

Ryan Site. At the base of the long spit that forms the southeastern side of Mobile Bay there is an artificial canal which has been named the Indian Canal for as long as anyone can remember. That this was in all likelihood a construction of the Indians is made plausible by the presence of mounds and village sites at each end. This canal is shown on Coast Chart No. 187 ("From Pensacola Bay to Mobile Bay," 1897) of the U.S. Coast and Geodetic Survey, which was based on surveys made from 1847 to 1892. In addition 2 more canals are shown on this map connecting Seymour's Bluff and Strong's Bayou with Little Lagoon. These can no longer be seen and have apparently been forgotten locally.

Near the southern end of the Indian Canal there is a village site marked by surface shell and pottery. Two small conical mounds were noted about 200 yards up the Canal in a northerly direction.

Old Blakeley. During Civil War times Blakeley, situated on a channel of the Mobile River east of Mobile was

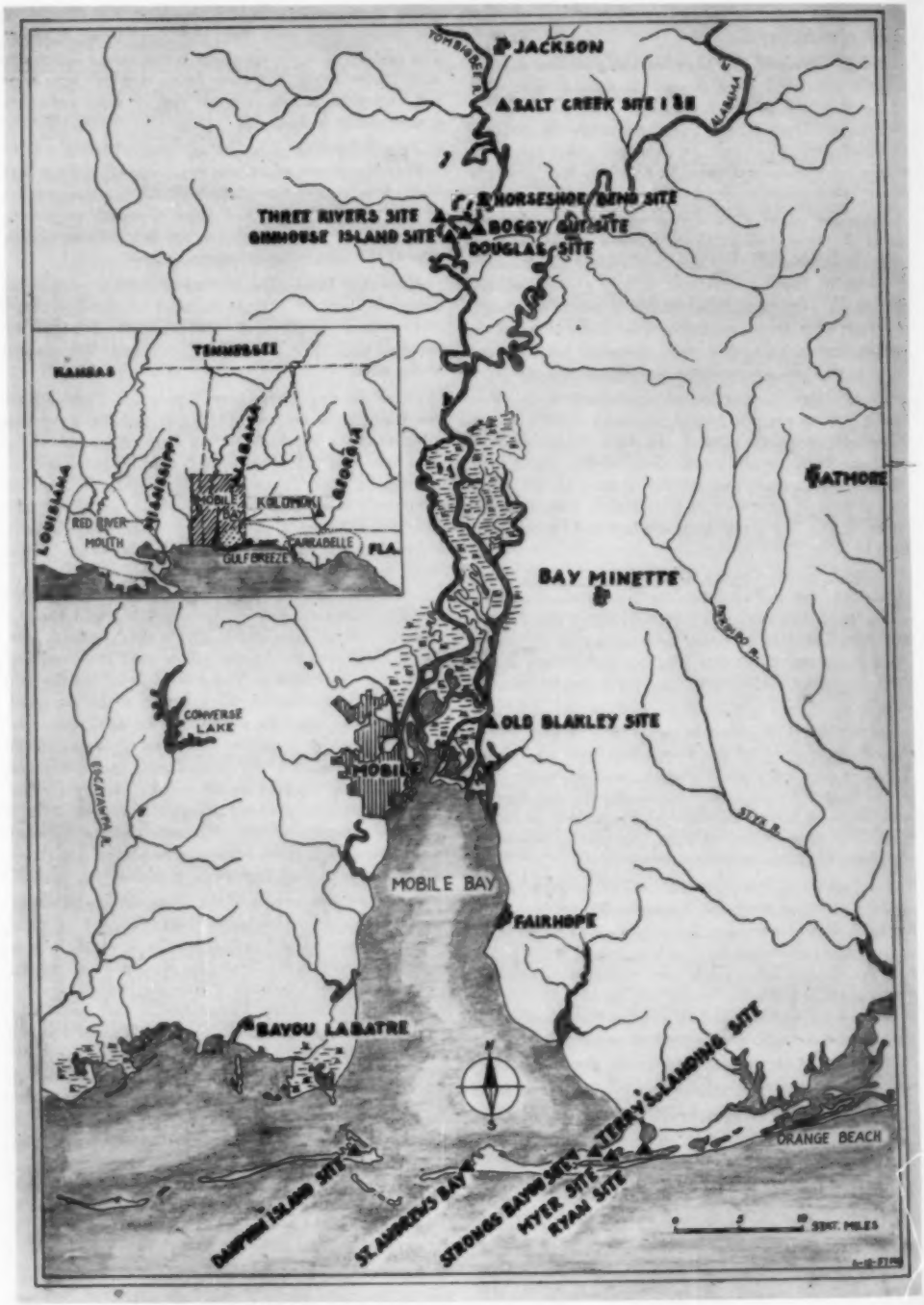

FIG. 1. Map of the Mobile Bay region, showing location of sites discussed.

an active and busy town. It has since been abandoned and is now difficult to reach except by water. Just south of Old Blakeley is a village site visited by Moore (1905b) who illustrates a fine sherd of Alligator Bayou Stamped. We visited one shellheap near this location, which produced a collection representing mainly the Bayou La Batre series.

Myers Site. On the shore of Little Lagoon, 2 miles west of the Indian Canal, is a deposit of shells containing pottery with a high percentage of Bayou La Batre Stamped.

Classification of the Pottery. Our collections have been classified in conformance with published descriptions insofar as possible. The pertinent type names and references to the original descriptions are listed in Table 1.

TABLE 1. MOBILE BAY REGION POTTERY TYPES.

Type Name	*Published Descriptions*
Deptford Bold Check Stamped	Caldwell and Waring 1939a Willey 1949: 357 Griffin and Sears 1950
Deptford Simple Stamped	Caldwell and Waring 1939b Willey 1949: 357-8 Griffin and Sears 1950
Bayou La Batre Scallop Impressed	Wimberly 1953a
Bayou La Batre Stamped	Wimberly 1953a
Alligator Bayou Stamped	Willey 1949: 372
Santa Rosa Stamped	Willey 1949: 376-8
Basin Bayou Incised	Willey 1949: 375-6
West Florida Cord-marked	Willey 1949: 388-9, 440
Swift Creek Complicated Stamped (early and late varieties)	Willey 1949: 378-83, 429-35
Franklin Plain	Willey 1949: 392-3
Carrabelle Incised	Willey 1949: 422-5
Weeden Island Incised	Willey: 1949: 411-19
Weeden Island Punctated	Willey 1949: 419-22
Indian Pass Incised	Willey 1949: 425-7
Plain Red	Willey 1949: 448
Wakulla Check Stamped	Willey 1949: 437-9
McCleod Simple Stamped	Wimberly 1953b
McCleod Linear Check Stamped	Wimberly 1953b
McCleod Check Stamped	Wimberly 1953b
Langston Fabric Marked	Heimlich 1952: 26
Moundville Incised	Heimlich 1952: 24-5
Moundville Black-filmed	Heimlich 1952: 29-32
Moundville Engraved	Willey 1949: 466
Pensacola Incised	Willey 1949: 464-5

It has been necessary to set up new pottery types in only a few cases. All of these types fall in the late periods, which were not well represented in collections of previous investigators. Formal description of these new types will appear in the series, *Prehistoric Pottery of the Eastern United States*. For present purposes it is sufficient to indicate enough features to make them identifiable.

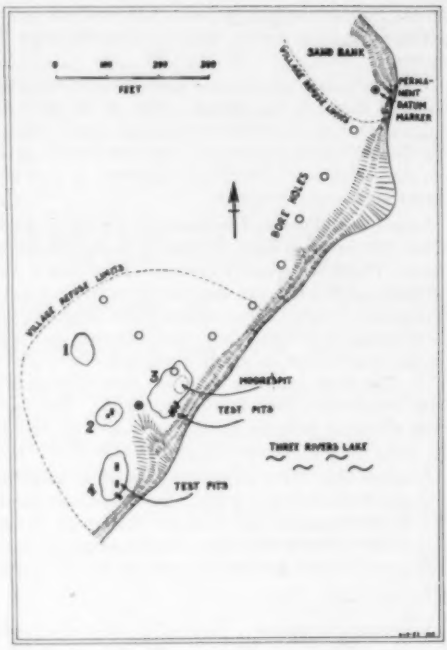

FIG. 2. Map of Three Rivers Lake site. (The northeast occupation area is called the Three Rivers Sand Bank on the chart of ceramic chronology, Fig. 3.)

McIntosh Incised, Douglas Incised, and Three Rivers Plain are tempered with a mixture of fine sand and shell. The complete range of tempering materials from almost all shell to almost all sand can be found. In this it agrees with the types described by Jennings (1941) for Wilson Plain and Oktibbeha Plain which are apparently contemporaneous. The decorated types seem to be direct, but decadent, descendants of Pensacola Incised and Moundville Incised. European goods are commonly found in association with the new types. The Douglas mound collection for instance contains a gun flint and a glass bead. Moore (1905a) has also reported finding glass beads and European medals in association with urn burials at Hooks' Plantation and with glass beads at Three Rivers Landing. These sites are within a short distance of the Ginhouse Island and Douglas sites.

McIntosh Incised is very similar in design elements to Pensacola Incised and Fort Walton Incised. It is characterized by parallel line incising around the rim area. Pendant loops are common, as are a stylized death's head

design. Notched rims are frequent. Four small rim nodes or flanges are often present, while loop handles seem to be rare.

Douglas Incised has the same temper characteristics as described above. It has incised arches on the shoulder area, usually four in number. Punctation, always present just above the incised arches, may take the form of parallel rows of dots or of short linear punctates. It is closely related to Moundville Incised.

Mobile Cane Impressed is apparently a local variation of the type Langston Fabric Marked from the Tennessee Valley. These two appear together at Salt Creek I, but the fabric-marked type has disappeared in favor of Cane Impressed at Boggy Gut. Mobile Cane Impressed is alway tempered with abundant coarsely crushed shell and appears to have been molded in a split cane basket before firing. The form is a. wide mouthed cone. Presumably these vessels were used to evaporate brine. This contrasts, of course, with the flat shallow dish of the typical salt pan from the Tennessee Valley (Griffin 1939: 151).

Southern Cult. The category we have called Southern Cult is actually those pieces which have discernible hand, eye, or skull designs incised or engraved on them. These were abstracted from the collections to attempt to measure in some degree the history of the movement in this area.

Seriation Analysis. Following the methods described by Ford (Phillips, Ford and Griffin 1951: 219-28), the collections from each site and level were classified and the percentages calculated. Total sherds for each site and level as shown in Figure 3 include all plain and decorated pieces. Percentages were calculated from this total. Minor types, with very low frequencies are not shown on the graph. These data were recorded on a large sheet of paper with the sites arranged in the left hand column in no particular order and the types across the top of the sheet. This sheet of paper was then cut in horizontal strips corresponding to each site and level. Levels at St. Andrews Point were numbered from the top down. By attaching a small piece of draftsman's tape to each end of the strip it could then be moved vertically in position relative to the others on a large piece of cardboard. To begin with, the strips were arranged and rearranged so as to bring the youngest sites to the top and the eldest sites to the bottom in chronological order. This step was comparatively simple. For instance, all shell-tempered pottery sites must be near the top, as they are everywhere in surrounding areas a recent intrusion. The stratified site at St. Andrews Bay showing Wakulla Check Stamped should take an intermediate position which would be preceded by the Santa Rosa-Swift Creek types of Willey. Finally, the sites with Bayou La Batre Stamped, which are known to be related to Tchefuncte, must come near the bottom. By using this sort of argument and then arranging the sites within groups to bring out the patterns, the order for the sites as shown in Figure 3 was reached. The position of Salt Creek II is not well established from the evidence available at this time. Its position in Figure 3 represents the best compromise possible between Wimberley's report (1953b) of finding the McLeod types in abundance in Weeden Island village sites and our own observation of its association with the earliest shell-tempered horizon at Salt Creek I. More sites and stratigraphic evidence will, we believe, confirm our placement in Figure 3. The surface finish on some of the sherds of the numerically dominant type, McLeod Simple Stamped, would appear to be produced by brushing and cross brushing. If this technique was actually the method used, an interesting parallel would be apparent between this type and Plaquemine Brushed of the Red River graph (Ford 1952).

Correlation of the Seriation Diagram with the Red River Chronology. The next step was to attempt to relate the sites to the time periods. By inspection it was obvious that the only series which spanned a long enough time for our needs was that set up by Ford for the Red River area in 1952. The other available series from the same publication for the Northwest Florida Coast covered times C to E only. Therefore we adopted the arbitrary time scale from the Mississippi Valley Survey and began our correlation by inserting time A on our graph at the Strong's Bayou site in order to separate the historic from the prehistoric sites. Next it was obvious that time C should fall at the point where the sharp break occurred between Wakulla Check Stamped and the McLeod types. Time B was assigned to the point where the transition between the Moundville types and the earlier shell and sand-tempered types occurred. By comparison with the Red River and Carrabelle chronologies, time D then fell at the point where Wakulia Check Stamped first appeared. Following this we had to consider where time E should be placed. On inspection of the collections for Alligator Bayou Stamped and Santa Rosa Stamped it

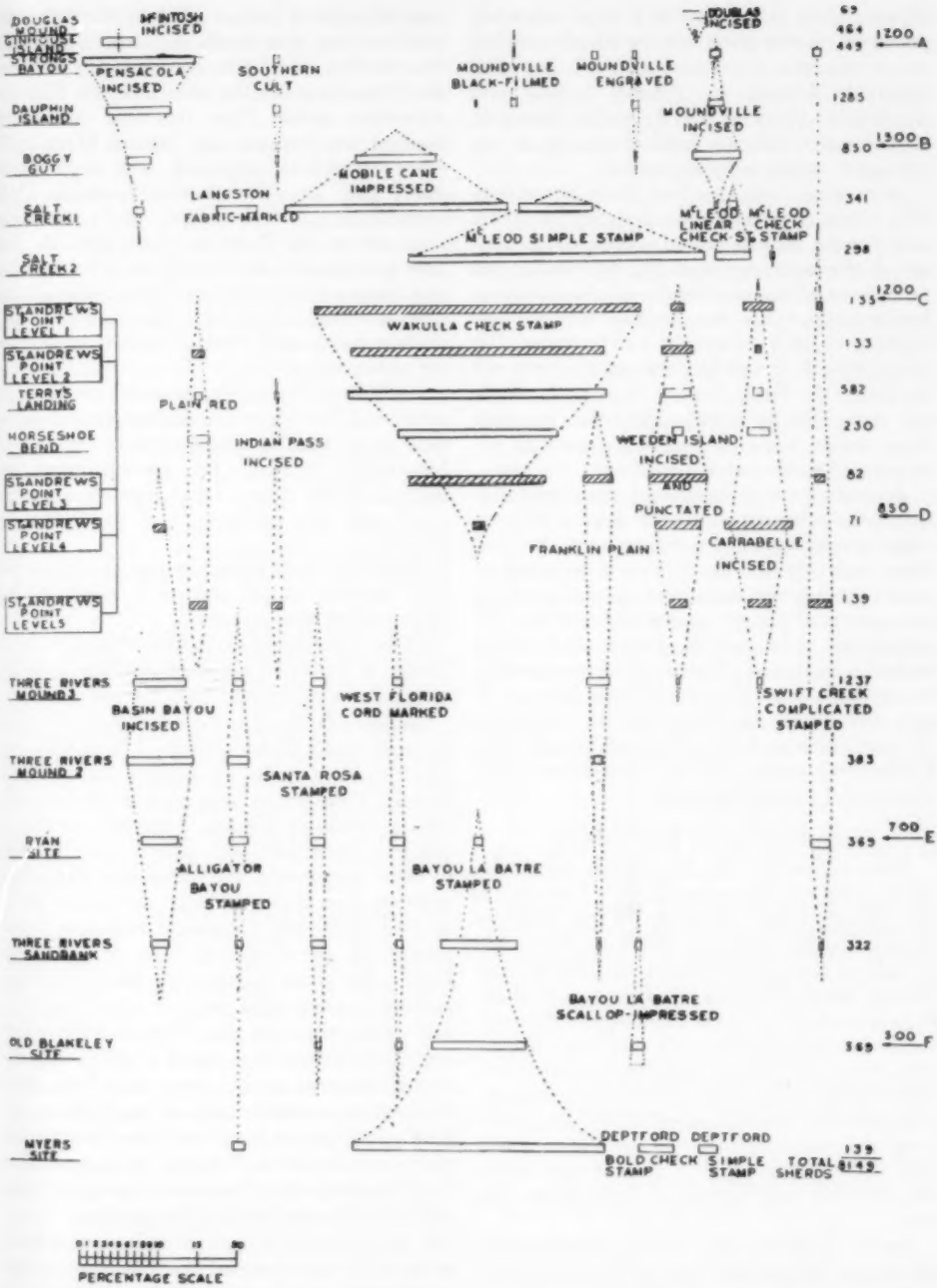

FIG. 3 . Ceramic chronology for the Mobile Bay region.

became clear that there had been a gradual evolution during their history which parallels the comparable development in Mississippi of Markville Incised to Yokena Incised and Marksville Stamped to Troyville Stamped. However this was not marked enough in our opinion to justify separate names.

Since time E in the Red River chronology falls at the transition point between Markville and Yokena Incised, which is close to the center of the appropriate graph, we simply put time E at about the center of the Alligator Bayou graph. This also coincides with the disappearance of the Bayou La Batre types. To assign time F we picked the maximum point for Bayou La Batre Scallop Impressed, which has a parallel in Crooks Stamped, the Red River series. Time G then was placed an appropriate distance below time F.

To make our correlation still closer we transferred the arbitrary time scale from Ford's ceramic chronology for the mouth of the Red River area (1952, Fig. 2) to a large sheet of paper, keeping the same relative spacing of the time points. Then the sites were fitted into the appropriate time periods, and spaced evenly within each period. This resulted in crowding of sites into the C-D space and the location of only one site in the F to G period. However, the graph now could be compared directly with Ford's 1952 graphs for the Red River, Gulf Breeze, and Carrabelle areas.

Comparisons and Conclusions

Historic Period. The sites of this period are likely to be contemporaneous with Leon-Jefferson (Smith 1948) of North Florida and the historic Natchez (Quimby 1942) of Mississippi, as well as the McKee Island site (Webb and Wilder 1951: 26-34) of the Tennessee Valley. In general this horizon is characterized by shell tempering and incised scrolls and loops in pottery, rectangular house trenches, extended primary burials, and early historic trade objects. It apparently carries forward in a degenerated form the techniques of the preceding period and represents the culture present just before the complete displacement of tribes from this area.

Periods A-B and B-C. If our placement of the sites of this period is correct then the graph indicates an early invasion of the area during time C of a people making shell-tempered pottery associated with a sand-tempered pottery. Identification of Langston Fabric Marked definitely indicates a northern and eastern origin for this movement which also probably reached the Tennessee Valley at about this time or somewhat earlier. From this base the culture evolved to produce the typical Moundville types of incised, engraved, and black-filmed ware, and to elaborate the Southern Cult. Moundville, we feel, is likely to be about the same age as the Dauphin Island site. At this time loop handles were common and rim nodes and flanges were scarce or absent. Pot shapes were globular and short collared. Plates and shallow bowls with interior incising or engraving were present.

At Strong's Bayou the previous trends were continued; Pensacola Incised became the dominant type with a corresponding decline of Moundville Incised. The casuela bowl appeared at this time. Loop handles are very scarce and are replaced by 4 rim nodes or flanges.

Typical Fort Walton designs are common, and indicate a position near time A for Willey's Fort Walton period.

Sears's (1956) suggestion that Wakulla Check Stamp is a part of the Fort Walton complex cannot be substantiated from our data.

Period C-D. By direct comparison our Figure 3 agrees much better with the Carrabelle area graph by Ford than it does with that for Gulf Breeze. This can be seen most easily by comparing Wakulla Check Stamped in the 2 graphs. Also the Gulf Breeze graph shows a large percentage of Carrabelle Punctated whereas this type suddenly terminates early in time D for the Carrabelle area and is not present in our collection from St. Andrews Point. For these reasons we feel that comparison is more valid between the Carrabelle area during this time than between Mobile Bay and Gulf Breeze, and indeed it seems that the coastal cultures in this area must have been following very similar lines of development. In Ford's 1952 paper the Sowell Site information was assigned to the eastern area graph. It would perhaps have been better to include this with the Western or Gulf Breeze data.

It is interesting to note that the lowest level at St. Andrews contained the largest percentage of Swift Creek Complicated Stamped sherds, which is apparently an indication of the precedence of this type over Wakulla Check

Stamped. This would tend to confirm the position of Ford and Willey in this matter. Sears in a recent publication (1956) indicates an opposite opinion derived from his work at Kolomoki.

Period D-E. The above situation is reversed during time D to E and the Mobile Bay chart now agrees much better with the Gulf Breeze graph than with Carrabelle. This is shown in the type Swift Creek Complicated Stamped which declines rapidly in the graphs as they are compared east to west. Also the types Alligator Bayou Stamped, Santa Rosa Stamped, and Basin Bayou Incised become prominent in both Mobile Bay and Gulf Breeze, and in the Red River chart the comparable types are strongly represented.

Period E-F. This period for Mobile Bay and the Red River seem to show a corresponding development of the Hopewell types to maximums at the end of the period. The major difference is the continuation of the type Bayou La Batre Stamped from time F-G into what we might call Marksville.

Period F-G. For the origin of the Bayou La Batre ceramic types we can point to no neighboring area with assurance, but are forced to rely on the generalized relationship of the types of this period having a drag and jab technique such as Stallings Punctate, Lake Borgne Incised, Wheeler Punctated, and others of this time level in the Southeast. These have been fully discussed by Griffin and Sears (1950) and it is believed that the Bayou La Batre series should be added to the list.

The McQuorquodale Mound. Assuming that our Figure 3 is approximately correct, it can be then used to date the McQuorquodale Mound (Wimberley and Tourtelot 1941) with better precision than was heretofore possible, although the pottery evidence is somewhat conflicting. The presence of Bayou La Batre Plain including characteristic base forms, Bayou La Batre Stamped and the fiber-tempered sherds would place McQuorquodale about time G-F, whereas the McLeod Check Stamped and the one sherd of Langston Fabric Marked would tend to place McQuorquodale at time C. Two alternative explanations are possible, (1) that the mound was built during time G-F and the check-stamped and shell-tempered sherds represent later intrusions, or (2) that the mound was built at time C and the fill used contained the earlier sherds. Of these 2 explanations the weight of evidence would appear to favor the first one.

Summary. From the foregoing, certain tentative conclusions can be drawn. These of course are subject to all the errors and uncertainties inherent in the method of analysis. These difficulties have been very fully discussed elsewhere (Phillips, Ford, and Griffin 1951: 219-28). Nevertheless it seems that pottery first appeared in Mobile Bay soon after its invention or diffusion to the Southeast. As time went by, increasing pressure or influence from the Lower Mississippi Valley forced the decline of Bayou La Batre in favor of Hopewell ceramics. At this same time a development of the Swift Creek cultures was taking place to the east which brought complicated-stamped wares along the coast as far as the Gulf Breeze area in considerable strength. From the fusion of these 2 streams there arose in the Mobile Bay area a new culture combining the stamping techniques of the Georgia area and the incising and punctating techniques of the Mississippi area. This new culture spread east, west and north with considerable vigor. In the Mobile Bay area this phase was terminated suddenly by an invasion of an early Mississippi period culture from the north and east, which then followed a development of its own the high point of which was the building of the ceremonial center at Moundville.

From this high point a decline set in which was accelerated and finally terminated by contact with Europeans.

Acknowledgment. The author wishes to express his sincere appreciation to all his friends and associates who so greatly assisted in this work. In particular his thanks are extended to Cobb McIntyre of McIntosh, Alabama, for his many services rendered during the past 3 years.

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CORRECTION

In the Membership List published in Vol. 23, No. 2, October, 1957, the entry which read "University Kasse Mainz, Ludwigshaven (Rhein), Pscha, Germany" was incorrect. It should have read:

Institut für Völkerkunde, Universität Mainz, Germany.

THE ARCHAEOLOGY OF THE LENA BASIN AND ITS NEW WORLD RELATIONSHIPS. PART I

PAUL TOLSTOY

IN AN EARLIER study (Tolstoy 1953b), we attempted to outline the Old World distributions of a limited number of ceramic elements and to make a case for their introduction into North America some 3000 to 4000 years ago. Russian reports that have appeared or become available to us since then (Okladnikov 1945, 1946, 1950b, 1955a, 1955b), as well as recent work this side of Bering Strait, prompt now a review of the sequence in the Lena Basin as a whole with North America parallels in mind. The main emphasis here is on the Neolithic of the Lena drainage and Archaic to Early Woodland developments in eastern North America.

THE PALEOLITHIC BACKGROUND

By way of an introduction to subsequent developments in the area, it is appropriate to note that the earliest traces of man in the Lena Valley occur in the form of a crude macrolithic industry, the main material of which is quartzite, with the main forms choppers and large semilunar or ovate scraper planes, roughly blocked out of pebbles (Okladnikov 1953a). Very similar to the better known Yenisey materials (Sosnovsky 1935; Yefimenko 1953: 572-89), this assemblage includes a relatively constant and apparently small proportion of prismatic core and blade tools and casual-flake burins. It was probably accompanied by a well-developed bone industry comparable to the Yeniseyan. While thus by no means "Mousterian" technologically, as some have maintained in the past, it shows, nevertheless, no perceptible relationship to the tradition of accomplished bifacial workmanship revealed in the early hunting cultures of North America, with which it is, without much doubt, largely coeval. Its distribution to date has not been found to extend any further down the Lena than the mouth of the Markhachan, some 400 km. upstream from Yakutsk. If significant similarities with American materials are ever to be demonstrated for this industry, they are most likely to lie with manifestations on the order of George Lake in Ontario, or the crude chopper using culture without points that has been postulated on an early level in western North America.

Be that as it may, controlled bifacial shaping techniques are actually first noted in eastern Siberia on a number of ovate (laurel-leaf) blades occurring in an otherwise typical pebble-scraper, core-and-blade, and bone implement context at Verkholenskaya Gora (Yefimenko 1953: 587-9; Okladnikov 1950a: 155) on the Angara River. These remains are probably younger than Sandia or Clovis by several millennia, even if certain extremely early New World radiocarbon determinations are discounted (Krieger 1957). In fact, the blades in question are viewed by Russian authorities as evidence for aligning Verkholenskaya Gora with the "latest [Paleolithic] sites of the Yenisey area, which already reflect the approach of the Neolithic" (Yefimenko 1953: 589).

THE PRECERAMIC NEOLITHIC IN THE BAIKAL

At a date which Okladnikov guesses to be about 5000 B.C., culture in the Baikal area (a cultural province which, in ceramic times at least, embraces the upper Lena) assumes a more progressive aspect. This is the still poorly represented Khin'skaya period. Core and blade tools now dominate the inventory and include many of the varieties of lamellar implements ably distinguished by MacNeish in his discussion of the Pointed Mountain and related sites in northwestern Canada and Alaska (MacNeish 1954: 239-46, 252). Notable among these tools are lamellar burins ("microburins"), which have an extensive distribution to the north throughout the Lena valley, though generally absent or scarce in the later pottery using periods of the Baikal. Unreported so far from North America are the highly distinctive lamellar points, partially retouched on the ventral side, both shouldered and unshouldered, which in Siberia are taken to indicate the appearance of the bow and arrow. They are not found in the late Paleolithic of eastern Siberia (Okladnikov 1950: 162), but have an extensive distribution in the Mesolithic and early Neolithic of Eurasia, as well as prototypes in the East European Upper Paleolithic.

Controlled bifacial chipping is still by no

means a prominent trait, but is exemplified by 2 (dart?) points illustrated by Okladnikov (1950, Fig. 16). One is teardrop shaped, the other incipient stemmed, and either would fit in a number of areas and periods in North America from the Archaic onward, as well as in some of the putatively early lithic complexes of the interior Northwest (MacNeish 1951, Pl. 8; 1954, Fig. 67, *1*; 1956, Pl. 1, *2*), though similar forms there are generally larger and heavier.

Other artifacts from the Khin'skaya burials include long unstemmed slate points, hexagonal in cross section, some shorter punchlike tools of flattened cross section, also of slate, and a beaver incisor, such as those found in later graves of the area, which Okladnikov (1955a: 116) suggests were hafted and used as cutting or gouging tools. Like most graves of succeeding periods, these were covered with loose stones.

Like Chard (1956), we follow entrenched Russian nomenclature in designating a post-Paleolithic complex such as this one as "Neolithic." Closely related remains occur in Trans-Baikalia, the Amur basin, Manchuria, and Mongolia (Okladnikov 1950a: 160; Teilhard and Pei Wen-Chung 1944; Maringer 1950). By European standards, they could be termed Mesolithic. Whether a similar preceramic culture is actually represented by any finds from the Siberian Arctic is debatable. Since, typologically at least, an industry closely related to the Khin'skaya is a fundamental part of demonstrably ceramic complexes in that area, there is good reason to hope that it will be proven eventually to underly them chronologically. MacNeish's finds in the American Arctic (1954, 1956) are certainly suggestive in this respect.

Ceramic Periods of the Baikal

For a bird's eye view of the Baikal sequence, the reader is referred to reviews (Tolstoy 1953a, 1957) of the 2 major Russian monographs to appear on the subject. We are here mainly concerned with (1) New World parallels, and (2) culture elements helping to cross-date the Middle Lena and Arctic sequences. It seems significant that the first of these concerns alone is sufficient to bring out an enumeration of a large majority of artifact types represented in the Baikal.

1. *Isakovo.* On the Upper Lena proper, this, the earliest, Baikal ceramic period is represented by at least 2 habitation sites, Byk and Yar. The latter has features that make it transitional to the following Serovo period. While Isakovo sites are generally scarce, their spread in the intensively studied Angara valley (the locus of the Baikalian type-sequence) leads Okladnikov to posit for them an extension coterminous with Serovo (1950a: 166) in the relatively homogeneous area in which his sequence holds.

Isakovo pottery has, by North American standards, a fairly Woodland cast (Fig. 1, *13*). Vessels are lump-modeled, egg-shaped or parabolic in form, and bear imprints of a rhombic or quadrangular, wide-mesh (up to 3.5 mm. sq.) knotted net, sometimes lightly smoothed over. The paste is grit or quartz-sand tempered, but also contains traces of what may be burnt-out organic inclusions. Decoration is sparse, consisting of a single row of hemiconical punctations or, more rarely, diagonal notches on the outer rim (Okladnikov 1950a, Figs. 19-24). Net impressions extend over the surface of the flattened lip. Net-impressed pottery not unlike the Isakovo occurs at some Early Woodland coastal Atlantic sites of the United States (Smith 1950: 196; Holmes 1903: 153; Evans 1955: 46-7, 61-2, 72-3, 123-4; Figs. 4, 8, 10, 15). In Virginia, it also exhibits some Serovo characteristics. In the Baikal, net-impression continues in use to Glazkovo times, being found in Ulan Khada II along with later ceramic features (Okladnikov 1950a: 103, 111, 113).

The survival of facially unworked prismatic flakes is noted in the Isakovo lithic inventory. Lamellar points probably also persist, since some have been found in late Serovo deposits (Okladnikov 1950a: 106). Rough ovate or semilunar scrapers not unlike the Paleolithic kind still occur. Unifacial rectangular side-blades come into use, together with bifacial ones, the latter remaining typical of succeeding pre-metal-using periods. While the side-blades of the American Arctic, which naturally invite comparison, are usually lunate in outline, at least one rectangular specimen, such as first appears in Isakovo, has been found in the Denbigh-like New Mountain complex of the Firth River area (MacNeish 1956: 97, Pl. 2, *28*) and others are reported by Collins (1956: 76, Pl. 3, *10-17*) from Southampton Island.

Bifacial shaping, generally speaking, dominates the flint industry of all ceramic periods

FIG. 1. Some artifact types of the Baikal Neolithic. *1-7*, points; *8*, stone fish effigy; *9*, *11*, *12*, adz blades; *10*, fragment of "man's knife"; *13*, pottery vessel; *14*, "male" hapoon head. Scale: all approximately ⅓ size except 13, which is approximately one-sixth. Associations and sources: *1*, *3*, *6*, *9*, and *13* are Isakovo (after Okladnikov 1950a, Figs. 22, 26, 29); *2*, *4*, *5*, *7*, *8*, *12*, and *14* are Serovo (after Okladnikov 1950a, Figs. 12, 39, 68, 71); *10* and *11* are Kitoi (after Okladnikov 1950a, Figs. 115, 123).

in the Baikal, and, in Isakovo, is exemplified by the most frequent point form, a rather large (4 to 4.5 cm. in length) broad asymmetric "swallow-tail" type (Fig. 1, *1, 2*) which Okladnikov thinks may have arisen through the application of bifacial finishing to the old shouldered lamellar type (1950a: 178 and Fig. 29). Similar points are rare in North America, but two of Early Woodland date have been illustrated, one from coastal New York (Smith 1950, Pl. 14, *27*), the other from Louisiana (Ford and Webb 1956, Fig. 30 *g*).

Two other point types, more popular in later times, are also present: one is similar to the preceding in outline and marked basal concavity, but is more nearly symmetrical (Fig. 1, *5, 6*); the other has a contracting stem (Fig. 1, *3, 4*). The latter resembles a type widespread in the Archaic and Early Woodland of the eastern United States which has received the appellation of "Gary point" (Suhm and Krieger 1954: 430, Pl. 94; Moorehead 1922, Fig. 48; Evans 1955, Fig. 23; MacNeish 1952, Fig. 15 *A*; Schmitt 1952, Fig. 21 *A*; Maxwell 1952, Figs. 96, *4*; 97, *18*; Coe 1952, Fig. 163 *L*; Caldwell 1952, Fig. 168, *4*; Ford and Webb 1956, Fig. 17).

Asymmetric triangular knives, similar in outline to the "swallow-tail" points but more massive, first appear in Isakovo and last through the Neolithic.

Stone grinding, often partial, is exemplified by adz blades, which vary from subrectangular to petaloid in outline and flat to plano-convex in cross section (Fig. 1, 9). The bit is frequently concave on one face and the implement, therefore, a broad gouge. These woodworking tools, as well as cleaver-like single-edge knives of distinctive shape (Okladnikov 1950a, Fig. 26) were already manufactured out of nephrite as well as softer materials. The adzes and gouges have parallels in the Archaic of the American Northeast (Ritchie 1944, Pls. 113, 123, 148, 154). Also noted among Isakovo ground stone tools are simple subrectangular shale or slate knives (Okladnikov 1946: 130, Pl. 20, 6).

Distinctive bone artifacts include spearheads slotted to receive the side-blades already mentioned (Okladnikov 1950a, Fig. 31), bird-bone tubes identified as needle cases, and a bone mattock (Okladnikov 1950a, Fig. 28).

Ornaments include pyriform pendants of immature elk's teeth, also very characteristic of Serovo (Okladnikov 1950a: 272, Fig. 84), but also apparently found in Isakovo (Okladnikov 1950a: 188) and dating back to the Paleolithic in European Russia and probably in Siberia as well (Yefimenko 1953: 482).

Burials are generally in extended position, the legs being sometimes slightly flexed, and the grave usually has a cover of stone slabs and boulders.

A burial site near Verkholensk yielded the earliest examples on record of the shouldered adz and of the fish decoy. The former is a characteristic artifact of the developed Neolithic of the Middle Lena. The latter is a bone fish effigy which appears to be the prototype of similar effigies frequently found in Serovo graves and as late as Glazkovo, usually of stone, though occasionally of bone. The burial site in question is dated as transitional from Isakovo to Serovo (Okladnikov 1953b: 18).

2. *Serovo.* The Serovo period is, in many of its aspects, climactic. It is abundantly represented by remains technologically much more impressive than the Isakovian. On the upper Lena proper, Serovo sites occur from Kachug to Zhigalovo, and Serovo pottery has been found as far North as the Solyanka site, near the mouth of the Vitim (Okladnikov 1953a: 256).

In pottery, the conoidal base form survives (Okladnikov 1950a, Fig. 55), but vessels are predominantly globular in shape, with somewhat constricted mouths. They sometimes have thick lugs, which may be perforated for suspension. Temper is finer than in Isakovo, and consists of grit and sand. Lump modeling is still the usual method of manufacture, but coiling also is attested (Okladnikov 1950a: 102). Net impressions are more often smoothed over. It is not improbable that net roughening, apart from smoothing, may be responsible for the indistinct pockmarks noted by Okladnikov on vessel surfaces, since this paddled treatment is one of which no awareness exists, to date, in the Russian literature.

Two new surface treatments appear: linear ("simple") stamping, produced by means of a grooved or ridged paddle, which persists to Grazkovo times, and fabric impression, also known from Kitoi (Okladnikov 1950a: 105, 112). Cord marking apparently occurs at Solyanka (Okladnikov 1953a: 257), where it is perhaps best seen as a Middle Lena trait, though there is a possibility that this technique is represented in the Baikal proper at least by Kitoi times (Okladnikov 1945: 46). Punctation

of the kind described for Isakovo continues in use and may nearly or completely perforate the vessel wall (Okladnikov 1957: 31), and crack-lacing is used to mend vessels (Okladnikov 1950a, Fig. 10).

The group of surface treatments enumerated above, the specific subconoidal and globular vessel shapes mentioned, evidence of the paddle-and-anvil, coiling, and crack-lacing techniques, a sand-tempered paste, and deep punctation in a single row on the rim constitute a trait cluster which recurs in toto in the earliest pottery of Virginia, the Prince George and Stony Creek series (Evans 1955: 60-4, 69-73, Pls. 14, 15, 18-20). In addition, of course, most of the features so far mentioned may be found, in variable combinations, on much of the earliest pottery of the eastern United States.

Several new modes of decoration, also of considerable currency in North American Woodland pottery, first appear in Serovo. They include: quadrangular-tooth dentate stamping, applied, in Okladnikov's opinion, by a tool of the "roulette" kind, bosses or nodes punched out from the interior of the rim, dentate ovoid ("maggot") and crescent-shaped impressions, incision in the form of X-shaped designs, and linear punctation ("drag and jab") with either a flat-tipped or pointed stylus. This last technique gains currency only in the succeeding Kitoi period, when the stylus tip is often serrate, and the pointed-stylus variety is noted specifically only for that phase.

There is a possibility that some of these impressions which he calls "maggot" may have been produced by means of a cord-wrapped stick stamp. In the case of Glazkovo imprints of somewhat similar appearance, this is very probable. In referring recently to the "maggot" type of decoration, Okladnikov (1957: 42) states that it falls in Ailio's "Wickelschnurornament" class, without expressing his own belief as to how it was produced. In the same passage, he remarks that "maggot" decoration is absent from Serovo burial ware, a statement apparently made to exclude the late Serovo deposits at Ulan Khada, where it does occur. Both the dentate ovoid and cord-wrapped stick stamp were used on Hopewellian pottery (Fowler 1955, Fig. 64 *c*, *o*; Wray 1952, Fig. 76 *c*).

All 3 Isakovo point types persist in Serovo, though in different proportions, the contracting-stem "Gary-like" form now predominating. A teardrop form also occurs (Fig. 1, *7*; Okladnikov 1950a, Fig. 12). In keeping with a trend that lasts through the Baikal sequence, points are, on the average, 1 cm. shorter in late Serovo than they are in Isakovo (Okladnikov 1955a, Table 6).

Most remarkable examples of fine chipping occur among Serovo spearpoints, lanceolate in shape and finished by means of fine diagonal parallel ("ripple") flaking. The appearance of this technique in the Baikal can be stated with confidence to be considerably later than in the Plains of North America, and quite probably later than in the American Arctic. It was also applied by the Serovians to the shaping of bifacial rectiangular side-blades.

In connection with the high development of flint technology, the rather frequent occurrence of bone and antler indirect percussion staves in Servo graves is significant. Ovoid pebble hammerstones are also found (Okladnikov 1950a: 192).

Burins are none too frequent at any time in the Baikal, even in the Paleolithic, though they are prominent in the lithic inventories of Middle and Lower Lena pre-metal-using cultures. The relatively rare Paleolithic burins of the Baikal usually have the form of casual flakes, and are of the angle and corner types. In the Serovo deposits at Ulan Khada, these varieties occur, but are accompanied by a new, characteristically Baikalian type, first identified by Debets: it is the polyhedral "core burin," obtained by working the end of a prismatic core to a chisel-like tip by repeated burin blows.

Other flint types of the period include lamellar perforators, of a type dating back to the Khin'skaya stage, and a variety of relatively small scrapers, including core scrapers.

Of the ground stone artifacts, adzes and gouges are now more often made of nephrite, and tend more frequently toward a regular, flat, rectangular cross section and a trapezoidal or rectangular rather than petaloid outline (Fig. 1, *12*). Suggestive of the Archaic Red Paint culture of Maine are stone fish effigies, which proliferate in Serovo and persist to Glazkovo in small numbers (Fig. 1, 8). Other ground stone forms include notched pebble sinkers, compound fishhook shanks (numerous in succeeding periods), abraders, and sandstone shaft straighteners (known from 1 Serovo specimen at Ulan Khada, but more characteristic of Kitoi) (Okladnikov 1950a, Fig. 107). In Eurasia, the appearance of grooved shaft

straighteners does not appear to antedate by much the spread of bronze.

The lobate (lugged) ax or hoe, a characteristic artifact of the Middle Lena Neolithic (Okladnikov 1955b: 85), dates back to Serovo in the Baikal (Chernetsov 1953: 10, Footnote 2).

"Male" harpoon heads, with unilaterally or alternately arranged large barbs and line guards (which become perforated in the Kitoi period), are first authenticated for Serovo and last through the remainder of the sequence (Fig. 1, *14*).

Evidence from Ulan Khada, first occupied during this period, indicates the house type of this and succeeding phases to have been a bark-covered tipi-like structure, held down at the base by a ring of stones.

As in preceding periods, graves are covered with stones, in the form of slabs or, more rarely, boulders, and the slabs are sometimes placed on edge to outline the grave. Cremation, partial and total, was occasionally practiced.

3. *Kitoi.* This period, the last in the premetal sequence, has many features which may be traced to earlier times. In pottery, linear punctation predominates, while vessel surfaces are most commonly linear stamped or smoothed. Shapes remain pretty much the same. Of the point types common in preceding periods, the asymmetric and symmetric "swallow-tail" forms persist, but the stemmed "Gary-like" points practically disappear (a few were found in the late deposits at Ulan Khada). Also represented is a teardrop shape. In keeping with the trend already mentioned, points are, on the average, 1 cm. shorter than in the preceding period. This trend should be of interest to Americanists since the diminution of point size with time has also been noted in North America, and has been ascribed by some to the spread of the bow and arrow. The bow, however, is present throughout the Baikal sequence, and is represented by actual preserved specimens of compound bows with bone backing in Serovo graves. Okladnikov's speculations as to the cause of this phenomenon revolve around (1) the devolution of the bow in the Baikal, (2) the adoption of arrow poison, and (3) a shift toward the hunting of smaller game; these reasons are far from convincing.

A number of artifact types first appearing in Kitoi presage the Glazkovo period, and are more typical of and frequent in the latter. In the point inventory, such types are: triangular forms with straight or concave bases (the most frequent Glazkovo type), lozenge-shaped points, sometimes truncated at the base (Okladnikov 1955a, Fig. 18, *8-11*), and some rare "problematicals" (Okladnikov 1955a, Fig. 18, *16, 17*) which, in deference to their counterparts in the eastern United States, Okladnikov terms "Americanoid." Available information on the Ulan Khada refuse sequence would seem to indicate that the first two may be present as early as late Serovo (Okladnikov 1950a: 100).

Large spear points or knives, like the Serovian, are still ripple flaked, but more often uniface. Large and relatively crude skin scrapers of argillite and quartzite appear, and have the form of round chips struck off boulders and steeply retouched along the edge (Okladnikov 1950a, Fig. 108). They are also frequent in Glazkovo and are identified by Okladnikov with the "tci-tho" scraper of the American Northwest. In Yakutia, the form is known archaeologically and ethnologically as the "kuochai" skin scraper. In North America, such scrapers, in addition to having a fairly extensive distribution in the Northwest and Plateau areas, are apparently earlier than in the Old World, being represented in the Scottsbluff level of the MacHaffie site in Montana (Forbis and Sperry 1952: 130).

Other flint types reported for the first time in the Baikal sequence are lunate side-blades, differing in shape from the rectangular kind hitherto exclusively present, and carrying over into Glazkovo (Okladnikov 1950a: 103; 1955a: 75), and semilunar chipped knives, also well represented in Glazkovo.

Nephrite is now the main material for adzes and knives, though the working of this material was practiced in previous periods, contrary to what we have erroneously implied elsewhere (Tolstoy 1953). Adzes now tend to be petaloid in outline and oval in cross section, and a few axes appear (Okladnikov 1955a: 108). A beveled adz is illustrated in Figure 1, *11* (from Okladnikov 1950a, Fig. 115). Smooth-edged beveled slate saws were used in manufacturing these tools. A new form of nephrite knife has beveled edges and a hexagonal cross section, and is very similar to the Eskimo man's knife (Fig. 1, *10*; Okladnikov 1950a, Fig. 123, *upper row*).

Beaver teeth, presumed to have been hafted and used as cutting or gouging tools, are recurrent features of Kitoi and Glazkovo inventories (Okladnikov 1955a: 116). They have already been noted for the Khin'skaya period, though not reported by Okladnikov for intervening phases. They suggest parallels in the Archaic of Northeastern North America, as do beaver half-jaws, with an incisor left in place, which were probably used in the same manner and which are also reported for New England (Willoughby 1935: 225). Concave dagger-shaped bone tree barkers, not unlike those used by the Eskimo, and probably serving to gather raw material for birch bark canoes (Okladnikov 1950a, Fig. 120; 1955a, Fig. 41) also persist in strength in Glazkovo.

Two musical instruments are reported for the Kitoi period: a bone whistle with several stops (Okladnikov 1950a, Fig. 125) and a panpipe (Fig. 126), the identification of which, however, is tentative.

Highly characteristic of Kitoi is the liberal use of red ocher in graves. In earlier and later graves it occurs only in small lumps, but is sprinkled profusely over Kitoi skeletons. Flexed burial and cremation are practiced. Combined male and female burials have been found and, in one of these, the male's hand has been placed so as to rest on the female's pelvis, a custom which, as Okladnikov (1950a: 382) points out, was also known in the Younge culture of Ohio. Separate dog burials are known both from the Kitoi and the following Glazkovo phase (Okladnikov 1955a: 302).

4. *Glazkovo.* The Glazkovo period, the last that need concern us here, might with some justification be considered the second of the 2 major culture climaxes that archaeology reveals in the Baikal. Economically, this climax appears founded on fishing rather than hunting. It is also marked by the introduction of copper and bronze metallurgy.

Pottery changes little, though dentate stamping is now infrequent, while bosses and linear punctation predominate. Short cord-wrapped stick impressions are typical (Okladnikov 1955a, Fig. 136, *second row from bottom, right*), though Okladnikov identifies them merely as "narrow chanelings with indented bottoms." The possible occurrence of this technique here is important in that it indicates a mainland distribution for an American Woodland feature hitherto reported, in Northeast Asia, only from Japan (Tolstoy 1953b: 33).

The point inventory consists of a gamut of 10 types distinguished by Okladnikov, whose descriptions, however, do not entirely cover illustrated material (Okladnikov 1955a: 62, Figs. 18, 99, 100, 103). Apparently new are long lanceolate forms, often with diagonal parallel flaking, not unlike the Angostura points of the American Plains and interior Northwest lithic sites, short lanceolate points also not unlike some early American specimens, and some elongate pentagonal and fish-tail varieties reminiscent of some Plainview points (Okladnikov 1955a, Fig. 18; see also our figure in Part II of this paper to follow). There are some indications that the first of these types is represented in Kitoi (Okladnikov 1950a: 360), while the second occurs among materials illustrated for the Chadobets site (Ryumin 1951, Fig. 3), described as dating "mainly" from the Serovo period. Highly characteristic of Glazkovo points are flake scars produced by basal thinning and unworked facial areas which give a superficial appearance of fluting (Okladnikov 1950a, Figs. 18, 99, 100). In size, these points are much smaller than the early American forms they resemble (compare Sellards 1952, Figs. 30, 31, 37).

Side-blades are now rare, but it is interesting that the rare examples found (Okladnikov 1955a, Fig. 22) are of the American Arctic type, that is, lunate, not rectangular, in outline.

A conversion of the woodworking industry to axes instead of adzes, and the frequent occurrence of tree barkers may indicate the replacement, by and large, of the dugout by the birch-bark canoe, which probably began in Kitoi.

Antler spoons first appear in Glazkovo (Okladnikov 1955a, Fig. 53), as do split-base bone arrowheads (Fig. 19) and combs (p. 101).

White nephrite rings, half-rings, and plaques are characteristic ornaments, useful in tying in the Baikal sequence with China, where similar ornaments occur in the Pan Shan painted pottery culture.

Burial practices are rather variable, the usual forms being inhumation in an extended or flexed position. Other positions include tightly flexed, sitting, and prone. Cremation is infrequent. Graves are usually covered with stone slabs, and sometimes outlined with up-ended slabs placed in the shape of a canoe. Orientation is characteristically parallel to the river

with the head downstream, a practice also followed in the Plateau area of North America (Collier, Hudson, and Ford 1942: 42).

The Middle Lena Sequence

While there exists room for argument in assigning absolute dates to the Baikal sequence, relative chronology is at least firmly established in that area. Such is not always the case further down the Lena valley. This is due, in a number of cases, to the unrepresentative nature of the collections available and is particularly true of sites apparently lacking pottery. A goodly number of the 140 or so sites reported by Okladnikov in his survey of the Middle and Lower Lena (1945, 1946, 1950b) are represented by materials that are both sparse and of little diagnostic value. In a few instances, however, the materials, while sparse, are typologically not without interest, and will be mentioned in the summary to follow.

1. *Dubious Early Remains.* In the Middle Lena valley, that is, roughly between the mouths of the Vitim and Vilyuy rivers, there are few reported sites that can be construed as preceramic and post-Paleolithic. One of these, which yielded a collection of chips, 3 lamellar flakes and one point, is situated near Kil'chan, opposite the mouth of the Vilyuy. The sample was gathered in cleaning a cut bank (Okladnikov 1945: 74). The point is uniface, with a pronounced dorsal ridge, oblique parallel dorsal ripple flaking, and is elongated lozenge shaped in outline. Since points of similar characteristics are in use as late as the Early Bronze Age in the Yakutsk area (Okladnikov 1950b, Pl. 11, 13), the absence of pottery and bifacial flints at Kil'chan can hardly carry much weight.

Generally speaking, however, the points usually found with Neolithic remains on the Middle Lena are bifacial, with the other important exception of those from Yuedey, a site near Olekminsk. At this site, Okladnikov (1947a: 100) found uniface lamellar points with only ventral retouching, similar to those current in the Lower Lena Neolithic and, to that degree, presumably in the same tradition as those described earlier for the Khin'skaya period of the Baikal. The finds occurred in a reddish clayey stratum which, in this area, underlies the gray sandy zone yielding most of the other Neolithic materials. It is not clear from published statements whether this site is the same as the one said to yield implements of reddish brown flint (Okladnikov 1950b: 85) and a type of smooth-surfaced, unusually coarse-tempered pottery containing large, angular inclusions of granite or trap (Okladnikov 1946: 129). In any event, the pottery in question is apparently unusual for the area, and may therefore be early in date, since it does not fit in the inventory of later Middle Lena cultures.

On the Middle Lena, the only other location reported to yield comparable pottery is Bestyakh, 22 km. south of Yakutsk (Okladnikov 1946), while similar sherds have been found on the Lower Lena in a blowout near Chokurovka and on the lower Angara. This occupational component involved at Bestyakh may or may not be the one referred to under *The Bestyakh Group* below. The lower Angara site referred to by Okladnikov is termed "late Neolithic" by that author, but since the associations included an ornament of pale nephrite, it should perhaps be dated as Glazkovo. Trap temper, however, is in use in the lower Angara region as early as Isakovo (Okladnikov 1950a: 166).

The more fully described pre-metal sites of the Middle Lena, all of which yield pottery, appear to fall into 4 groups which probably follow one another in time (Okladnikov 1955b: 78-91).

2. *The Bestyakh Group.* The earliest of these is characterized by net-impressed pottery similar to the Isakovo and early Serovo of the Baikal, to the apparent exclusion of other types (Okladnikov 1955b: 78-9). Thus, near the Yakutsk target practice building, on the southern outskirts of the city, net-impressed sherds of this kind were recovered from the upper (Sergelyakh) terrace of the Lena in the course of excavations for sand (Okladnikov 1950b: 89). They were associated with a concentration of charcoal, which also yielded chips, fragments of blades, and an asymmetric concave-base (that is, Isakovo-like) point. Okladnikov considers the site to be the earliest in the immediate vicinity of Yakutsk.

At Pokrovsk, upstream from Yakutsk, net-impressed sherds were found eroding out of the slope of a high terrace at the mouth of Pokrovka Creek; associated were conical cores, blades, chips, and an end-scraper. The arti-

facts came from a yellowish sandy layer below the modern dark soil zone (Okladnikov 1950b: 13).

On the northern fringe of the Middle Lena area, at Ungaiy, "Serovo-like" net-impressed sherds were gathered on the surface (Okladnikov 1945: 50).

Finally, at Bestyakh, Okladnikov found fragments of net-impressed vessels, decorated with crisscross incisions and a row of round perforations in the rim (Okladnikov 1950b: 20-1). Since the 2 last-named finds seem to be small surface samples lacking other associations, their chronological status may not be secure. However, Okladnikov appears to view Bestyakh as the type site for this early ceramic level (1955b: 78-9).

3. *The Turukta Group.* An apparently later phase is represented by 2 components: the lower occupation of the stratified Turukta site, in the southern part of the area, and the site near the Yakutsk Regional Hospital (Okladnikov 1955b: 79-80; 1950b: 89-90, 93-5, 107-9).

The Turukta deposits represent a permanent settlement of hunters, probably living in above-ground dwellings of light construction, since only a hearth area could be identified. Vessels bear imprints from malleation with a grooved paddle, are round bottomed, and are decorated with parallel deeply incised lines around the neck. Points are finely flaked on both faces and are elongate-triangular in outline with pronounced basal concavities, and thus similar to a frequently occurring Serovo and Kitoi type. Other finds include 2 large bone spear or dart points of triangular cross section, concentrations of red ocher, and 2 objects of pale nephrite: an awl and a pendant. Pale nephrite was apparently worked, and probably obtained, locally on the Middle Lena (Okladnikov 1955b: 84-5) during the Neolithic, *not* traded in from the Baikal.

The Yakutsk Hospital site (lower component) yields the same kind of pottery with a linear-stamped surface. The impressions are oriented vertically in relation to the rim (Okladnikov 1950b, Figs. 12, 25, 26). The pots are egg-shaped, the broad end of the egg constituting a rounded bottom, the mouth being somewhat constricted. This is a frequent shape in the Baikal from Serovo onward. Temper is crushed quartz. Vessel walls vary between 2 and 7 mm. in thickness. In one instance, paddle impressions were noted between laminations of the vessel walls, indicating that the ridged paddle used in finishing the vessel was also used in the process of forming it. Decoration consists of parallel horizontal incised lines on the rim, or X-shaped incisions. A single row of perforations usually occurs below the lip, the latter being notched. Shoulders bear incised triangles. The stone inventory includes several subtriangular end-scrapers, a fragment of a bifacially flaked side-blade, a massive perforator, a point fragment, and a chip of pale nephrite.

4. *The Kullaty-Munku group.* The third well-defined ceramic phase in the Middle Lena area has been termed "developed Neolithic." It is represented by deposits of intensive occupation at Kullaty (not far from Yakutsk), Malaya Munku (near Olekminsk), and a number of other, less intensively investigated locations. In addition, a site at Khatanga, on the river of the same name, north of the Arctic circle, appears culturally to be related more closely to these Middle Lena components than to the Lower Lena sites to the east.

The stratified site of Kullaty, situated on the second (12-13 m.) terrace of the Lena at the mouth of Kullaty Creek, has 4 occupation layers. The earliest (IV) yielded a small, nondistinctive sample of animal bone fragments, chips, and lamellar flakes. The next (III) is represented by a small sample of material that is culturally identifiable. Occupations IV and III both occur in a light-colored sandy stratum apparently predating the formation of modern soils on the second terrace and dating from a time when the surface of this terrace was nearer the water level and a plant cover had not yet become established. There is evidence of stagnating pools containing accumulations of fresh-water shells in occupation stratum III. Occupation II is represented by a large Neolithic sample and, with Occupation I, occurs in the upper part of Okladnikov's cut, consisting of the more recent dark brown soil and humus layers. Occupation I is apparently a stratigraphically compressed unit containing Bronze Age and late Neolithic materials and, also, it would seem, some Early Iron Age artifacts.

Occupations II and III differ little culturally, II being represented by a larger sample also containing some slight admixture from Occupation I, due to the unclarity of stratigraphy

in some points. Net-impressed, linear-stamped, fabric-impressed, and cord-marked pottery are present. A few check-stamped sherds from the upper portion of Occupation II may have intruded from I.

The net-impressed pottery from Kullaty III-II, sometimes partially smoothed over, differs somewhat from the Isakovo and Serovo in bearing the imprints of a finer, smaller-mesh net, made of thinner strands (Okladnikov 1950b: 57). Lip surfaces often bear oval indentations or round punctations, while rims always have a horizontal line of circular perforations. Rims are slightly incurving and vessel form is presumably globular.

Linear-stamped ware is apparently similar in finish and decoration to that current in the previous phase. The nature of some of the grooving, however, caused Okladnikov in 1950 to consider the dragging of a toothed implement over unfired vessel walls as an alternate (or partial?) explanation of its appearance. This practice is also exemplified on some Early to Middle Woodland pottery in New England (Moffet 1951: 104). Rims at Kullaty are generally decorated with horizontal incised lines and a row of perforations below the lip, which may be notched. Pointed bottoms belonging to this type have been found, and these bear paddle impressions that overlap, converging toward the point of the base. Geometric incisions of branching parallel lines have been observed on some vessel bases, but it is not clear whether they should be assigned to linear-stamped ware. Numerically, linear-stamped pottery is probably not very prominent at Kullaty, its peak having occurred earlier in the Turukta phase.

Cord-marked pottery apparently constitutes the bulk of the ceramic material from Kullaty III-II. After some hesitation in previous publications (1945, 1946, 1950b), Okladnikov now (1955b) is inclined to consider the rather regular, vertical imprints of closely adjoining cords found on his "Class 1" pottery of the 1950 report as "imparted with a beater wound with thick twisted cord, such as used in pottery manufacture among North American Indians" (p. 88). He had already suggested this interpretation in 1947 in connection with the Khatanga pottery. Cord-marked vessels at Kullaty typically have markedly pointed bases, where the cord imprints converge. Interior cord marking sometimes occurs at the base. Rims often have the usual row of perforations, and may be decorated with horizontal or diagonal incised lines and horizontal or diagonal dentate stamp impressions produced with a blunt-toothed or, occasionally, a triangular-toothed implement. Similar impressions may occur on the lip. In North America, where quadrangular-tooth dentate stamping is widespread, impressions of stamps with triangular teeth are found on pottery of the Wheeler fiber-tempered series in northern Alabama (Sears and Griffin 1950), in Early to Middle Woodland in New England (Moffet 1951, Fig. 45, *13*), and in Illinois Hopewell (Fowler 1955: 220). Triangular-tooth stamping is a prominent feature of Middle Lena Bronze Age pottery (see Okladnikov 1950b, Pl. 5, *2, 4*).

Fabric-impressed pottery is also numerically important at Kullaty. Okladnikov's descriptions (1950b: 45, 58) and somewhat substandard illustrations (Pl. 15, *1-3*) make it reasonably certain that the impressions belong to what, in eastern North America, has been called a "plain plaited fabric" (Sears and Griffin 1950). The impressions are those of a widely spaced heavy warp and a close fine weft and are applied in patches that overlap. Rims in this type are usually perforated, slightly thickened, and may be decorated with simple incised or dentate-stamped linear designs.

Other traits of Kullaty Neolithic pottery include crack-lacing and worked sherds (Okladnikov 1950b, Pl. 20).

Points include the familiar Isakovo-Serovo asymmetric type which, on the Middle and Lower Lena, has a more attenuated asymmetry and/or basal concavity (Okladnikov 1950a, Pls. 29, *4, 6, 9*; 36, *2*). Other points are also asymmetrically spurred, but have more elongate proportions and often resemble quite closely an elongate asymmetric form found at Denbigh (Giddings 1951, Fig. 61a, *8-10*) and Ipiutak (Larsen and Rainey 1948, Pls. 2, *7-8*; 35, *21-5*, 29, *37-9*). Some elongate triangular and pentagonal specimens from Kullaty II (Okladnikov 1950a, Pl. 29, *10, 14*) are not unlike some Glazkovo forms, but probably have analogies in Kitoi as well. Diagonal parallel flaking is also represented (Okladnikov 1950a, Pl. 29, *11, 17*); one long-stemmed point fragment (Pl. 32, *2*) is reminiscent of a rather distinctive early American Arctic type found at Anaktuvuk in a Denbigh-like context (Irving 1951: 52) and in the Firth River Corded level

of Engigstciak (MacNeish 1956a, Pl. 3, 3). A similar point has been illustrated for the Early Woodland Baumer culture of Illinois (Maxwell 1952, Fig. 96, 4).

Other flint artifacts include cores of the pyramidal, prismatic, and tongue-shaped varieties, bifacial rectangular side-blades, one unifacial rectangular side-blade from Kullaty III, one ovate side-blade, a variety of small dorsally flaked, almond-shaped, subtriangular and subrectangular scrapers, perforators, and a number of facially unworked lamellar flakes retouched as end-of-the-blade scrapers (the predominant scraper type), as spokeshaves, and as burins. This assortment of lamellar tools is clearly part of the core and blade tradition underlying many developments in eastern Siberia and Arctic North America. Also found were 2 quadrate "pièces écaillées," a type also found in the Paleo-Eskimo culture (Meldgaard 1952: 223, Fig. 76, 15; Okladnikov 1950a: 71, Pl. 22, 11), and some burins made of casual flakes, one of them beaked.

Other artifacts at Kullaty include pebble hammerstones, perhaps a portion of a grooved shaft straightener (Okladnikov 1950a, Pl. 36, 7) from Level III, bone awls, a needle, a needle case, "male" harpoon fragments, a portion of a bone whistle, and small birchbark rolls, found on the floor of the house pit apparently correlated with Occupation III. Such rolls are occasionally found at other sites in the Lena Valley (Okladnikov 1946: 43, 92) and at Kylarsa, in particular, they are described as charred. It seems likely that, like similar rolls found at Eskimo sites (J. A. Ford, personal communication) and in interior British Columbia (Borden 1952: 33), they were used as torches. Large sheets of birchbark perforated for joining also occurred on the Kullaty III floor area.

Malaya Munku, some 700 km. upstream from Kullaty, appears to be remarkably similar to it culturally. As at Kullaty, pottery was net impressed, linear stamped, cord marked, fabric marked, and dentate stamped (Okladnikov 1955b: 84, 88; 1945: 89), sometimes with pointed bottoms, though more frequently globular. Check-stamping, more characteristic of the following phase of the Middle Lena Neolithic, also occurs. "Impressions of separate cords" mentioned by Okladnikov may mean the presence of decorative cord impression, a technique also known in the Baikal at a date which can only be bracketed as late Serovo to Glazkovo (see Petri 1916, Pl. 13, 26). The core and blade inventory at Munku is apparently similar to that of Kullaty. Point types, not published in any detail, include a teardrop shaped form not reported for Kullaty (Okladnikov 1946: 105). Ground stone is better represented, and types include the lugged ax or hoe, the shouldered adz, a wedge, a paddle-shaped club (Okladnikov 1955b, Fig. 18), and notched pebble sinkers. Rather surprising is the evidence for domesticated cattle in the form of an ox tooth. Fragments of pale nephrite are interpreted to indicate the local working of this material. Bone needles and needle cases are found. As at Kullaty, the economy appears to be predominantly one based on hunting and fishing, with some evidence of the latter's growing importance, a trend paralleled in the Baikal in Kitoi times.

The absence of well-defined floor areas associated with the occupational remains at Munku, in conjunction with the evidence of presumably Neolithic petroglyphs in the Olekminsk and Yakutsk areas, leads Okladnikov to posit an above-ground domelike house type not unlike the Yakut summer house or "urasa." The latter was a round, wigwam-like affair, sometimes very large, with a central smoke hole and a wall of large posts interspersed with smaller poles.

A number of sites sampled or tested by Okladnikov in his survey may be aligned with Munku and Kullaty on the basis of fragmentary evidence. Thus, a cluster of 5 sites outside of Yakutsk yield core and blade tools, points with concave bases and cord-marked (or fabric-impressed?) sherds (Okladnikov 1950b: 87). At a site near Kapchigai, north of Yakutsk, Okladnikov found cores, chips and some fabric-impressed sherds (1945: 21). Like Kullaty, and unlike the late Neolithic site of Ymyiakhtakh, the site was on the higher, older terrace of the Lena. Further north, downstream from the mouth of the Aldan and opposite the island of Barbatchiki, Neolithic remains of similar type were found at 2 points on the shore of a small lake (Okladnikov 1945: 43-8). The finds include a mortar and a pebble grinder, presumably for ocher, some adz blanks, and cord-marked sherds, sparsely tempered with river quartz. Decoration consists of a row of deep punctations on the rim somewhat like those on Isakovo and Serovo pottery in that they fail to perforate completely the vessel wall. 18 km.

north of Sangar, near the mouth of Chachime Creek, cord-marked sherds were also found (Okladnikov 1945: 73). Syura Ara, the site on the Aldan River described by Davis (1940), rather clearly falls into the same group of sites on the basis of its fabric-impressed, cord-marked, linear-stamped, and dentate-stamped pottery.

Finally, the Khatanga site (Okladnikov 1947d) would extend the area of the Middle Lena developed Neolithic phase north and west nearly to the shore of the Arctic Ocean. Scrapers, elongate asymmetric "spurred" points (one ripple flaked), casual-flake burins, a fragment of a shouldered adz, lamellar flakes, and pointed-bottom pottery treated with a cord-wrapped paddle all fit well in the inventory of a site such as Kullaty.

5. *The Ymyiakhtakh Group.* The terminal Neolithic of the Middle Lena is typified at the stratified site of Ymyiakhtakh, on the lake of the same name (a former channel of the Lena), about half way between Yakutsk and the Aldan River mouth. It is situated on the lower ("Yakutsk") terrace of the Lena. Four occupation levels were noted, and all belong to the late Neolithic phase, thus offering a good opportunity to refine dating within that phase. Unfortunately, the needed frequency distributions of artifacts in the deposits are not given.

The predominant pottery type is check stamped and fiber tempered (Okladnikov 1945: 32; 1950b: 136-8). Checks are usually square, rarely rectangular. Check size is given as 4 mm. for Kullaty I (1950b: 39), and 2 mm. for Sangar Khay (1945: 63). (Both these components are actually of Early Bronze Age, a period in which this type persists in strength.) Interiors are generally marked with fiber tracks, which are sometimes those of animal fur, and at other times appear produced by plant stalks. Similar imprints occur within the paste, which is coarse, friable, and laminated in structure and, in one instance, was noted to have fish scales as inclusions. There is no doubt that fiber-tempering, animal and vegetal, is involved at Ymyiakhtakh. At the same time, descriptions of the same type at other sites definitely leave open the possibility that some of the fiber tracks may be due to the use of a fur-covered implement and are thus a feature of surface treatment rather than of paste. The same problem exists in the interpretation of some Eskimo pottery (Oswalt 1953: 13). Vessels were probably globular in shape, with incurving rims, occasionally decorated with rim perforations and incision. Smooth sherds are also present, and may be sparsely tempered with sand or fiber tempered (Okladnikov 1945: 32). Some have smoothing marks (striations) on their inner surfaces. Others have dentate stamped rectilinear designs and, in one instance, a dentate stamp was used to create "some kind of complex decorative design, which may be interpreted as the stylized representation of a bird or animal head." A handful of sherds show textile imprints such as would be produced by "laying a damp rag on the surface of the unfired vessel." Of the older pottery types, one linear-stamped (Okladnikov 1950b: 138) and one cord-marked sherd (1945: 33) were found. Examples of crack-lacing occur.

Burins fall into 3 classes: teardrop shaped angle burins flaked on the dorsal face and retouched along one long edge, the other bearing the graver facet (Okladnikov 1955b, Fig. 27, *7, 10*); polyhedral core burins of the Baikalian type; and a local polyhedral type, with a faceted pointed butt; and a relatively narrower faceted working end (Fig. 27, 8, 9). The first mentioned call to mind some forms of the American Arctic.

Points are predominantly elongate-triangular in outline, with straight or very slightly concave bases, thus resembling common Glazkovo forms. A point from the lower (III-IV) occupation zone was of the asymmetric, elongate, spurred kind. Another from level II was completely flaked on the dorsal face only, and almond shaped in outline. It resembles a form occurring on the Lower Lena. Other flint forms include cores, blanks, bifacial side-blades (two of them oval), one facially unworked lamellar side-blade, and a variety of scrapers. Generally, the quality of the flintwork is inferior to that of the preceding period.

The presence of an asymmetric point and the absence of smooth-surfaced dentate-stamped sherds in the lower levels may be temporally significant.

Near the mouth of Khoro Yurege Creek, south of Yakutsk, Okladnikov found concentrations of charcoal, chips, 2 scrapers, and check-stamped pottery some of which, interestingly enough, was linear check stamped, that is, the lands between the checks were heavier in

one direction than in the other (Okladnikov 1950b, Pl. 39, *7*).

Finds of check-stamped pottery at Markha in the same general area (Okladnikov 1950b: 110) may be close in time to Ymyiakhtakh and Khoro Yurege.

Whether a Late Neolithic or Early Bronze dating should be given these last 2 small samples is actually open to question, since the transition to early, and then developed bronze is a gradual one.

6. *Early Bronze.* The exact point of transition to Early Bronze Age needs to be described in terms of pottery type frequency distributions, which Okladnikov does not give. The identification of remains as Early Bronze in age must otherwise rest on such relatively less frequent diagnostic artifacts as compound split-base and split-tip bone arrowheads, split-base and wedge-base bone arrowpoints, tree barkers ("daggers"), pottery ladle sherds, slag fragments, or actual metal objects. Check-stamped and even linear-stamped pottery actually persist in the Middle Lena to the Early Iron age (Okladnikov 1945: 68). To be definitely referred to the Early Bronze period are the Kullaty burial (Okladnikov 1950b: 79-84) and most of the material from the upper occupation of the Kullaty site proper (Okladnikov 1950b: 37-55), in which are found some of the distinguishing traits listed above. A Glazkovo-like ring made out of pale nephrite was found in Kullaty I.

THE LOWER LENA — ARCTIC SEQUENCE

The area extending eastward from the Lower Lena to the Chukchee Peninsula across northeastern Asia comprises 2 archaeologically distinct provinces. One is that of the riparian tundra and wooded tundra fishers and hunters, represented at such Neolithic sites as Syalakh and Uolba on the Lena, other sites on the lower Indigir'ka and Kolyma, and some inland finds on the Chukchee Peninsula. The other is that occupied, perhaps as early as 500 B.C., by the sea-mammal hunting Eskimo, and extending from the mouth of the Kolyma to Bering Straits and south along the coast. The archaeology of this latter province has been ably summarized by Chard (1955a) and will not concern us here any further, except to point out that the relatively late appearance of check-stamped and linear-stamped pottery in Okvik would seem rather clearly to tie in with the probably older spread of these features eastward through the Arctic to the Kolyma, where the Eskimo and Interior areas border on one another.

1. *Possible Early Remains.* Remains of dubious but potential preceramic status are more numerous in the Arctic area than on the Middle Lena. They have been discussed and illustrated by Chard (1956). At Kestriryungka (Okladnikov 1946: 135, Site 88) a Serovo-like bifacially flaked knife, a lamellar point, and a conical core were found without pottery. At Ebetiem (Okladnikov 1946: 104), a short-stemmed uniface point, flaked dorsally and partially retouched on the ventral side, occurred with some lamellar flakes. One of a number of flakes picked up near Zhigansk (Okladnikov's Site 59), not far from Uolba, evidenced ripple flaking which reminds Okladnikov of the point found near Kil'chan (Middle Lena, discussed above). One of the locations sampled near Chokurovka (Okladnikov 1946: 127) yielded a large ovate spearpoint or knife blade, diagonally parallel flaked on one face and only partially retouched on the other, a rectanguloid side-blade, and the rounded base of another incompletely retouched spearpoint or knife. Pottery, again, was absent from this material, gathered, apparently, on the surface.

None of these finds can very well be shown to be preceramic, since ceramic sites in the same area yield similar lithic materials and the samples involved are very small. The occurrence of diagonal parallel flaking as early as the archaeological record will take us, however early or late that may be, seems nevertheless worth pointing out.

Similar doubts as to genuine preceramic status must be cast on the 2 Uolba burials (Okladnikov 1946: 13-15; Chard 1956: 406 and Fig. 133, *1-5*), which contained the extended skeletons of an adult and a child, sprinkled with red ocher, and accompanied by an end-of-the-blade scraper and 4 long, stemmed prismatic points resembling some Karelian and Scandinavian forms, but quite unlike anything in the New World. The absence of pottery here may well be a feature of ritual, as it is sometimes both in Eurasia and in America.

2. *Chokurovka and Syalakh.* It is far from clear which of the pottery complexes of the Lower Lena should be considered the earliest,

and Okladnikov's expressed opinions have borne, to date, only on the relative succession of the Uolba and related sites, for which there is stratigraphic evidence. However, 2 other kinds of pottery have been found on the Lower Lena, and, in the light of comparisons with the Middle Lena sequence, they may well antedate Uolba.

The first of these (Okladnikov 1946: 128-9), found at a blowout near Chokurovka, is a thick-walled, crude, smooth-surfaced ware, with abundant and coarse angular trap or granite temper. Okladnikov compares it to previously mentioned pottery from the Middle Lena, the dating of which, however, is in doubt. In apparent association with it were found some chips and lamellar flakes, as well as a subrectangular ground knife blade of white slate. Knives of this type and material are not generally found on the Lower or Middle Lena, but are typical of the Baikal from Isakovo to Kitoi.

Another, probably early, variety of pottery occurs below a Bronze Age occupation level at Syalakh (Okladnikov 1945: 88-9). It is net impressed, quartz sand tempered, with rims decorated with a row of perforations and diagonal dentate stamping on the lip. Okladnikov (1955b: 79) correlates it with the early northward extension of Isakovo-like pottery, that is, with the earliest reasonably well-defined ceramic horizon on the Middle Lena. However, he has also compared it with the later Malaya Munku pottery (1945: 89), where, as at Kullaty, net impression persists. The Syalakh pottery was found on a depressed floor area and was accompanied by fire-cracked rocks, apparently brought in from a distance, and some lamellar burins.

3. *Early Uolba.* A better-known ceramic period of the Siberian Arctic is represented by the lower occupation of the Uolba Knoll village site, with which a pit-house floor is apparently correlated, and to which the 2 burials referred to earlier are close in time and culturally related, in Okladnikov's estimation (1946: 141). Another component on Uolba Lake, the "Brick Shed" site (Site 67) is assigned a comparable age (1946: 37).

Characteristic flint types at both sites are trihedral "file-shaped" points (Chard 1956, Fig. 133, 6, 7), elongate bifacial lanceolate points (Okladnikov 1946, Pl. 5, 3, 4), conical and prismatic nuclei, end-of-the-blade scrapers, and lamellar burins. In addition, the Knoll site has lamellar points, partially retouched (Chard 1956, Fig. 133, 8, 9), facially unworked side-blades (with one edge retouched), some small scrapers (Okladnikov 1946, Pl. 5, *11-13*), the basal fragment of a large bifacial point with a broad, slightly inset stem (Pl. 5, 9), a long lanceolate diagonal-flaked point with a straight base (Pl. 5, 5) the fragment of another one (Pl. 5, 8), and a portion of a leaf-shaped knife with diagonal flaking on one face and only edge-retouch on the other. The Brick Shed site yielded a convex-base point with diagonal flaking over a dorsal ridge and only partial retouch on the ventral side, very similar to the Kil'chan point, a lamellar flake with one diagonal retouched extremity, a perforator, and fragments of a scraper and a knife.

Pottery was notably scarce at both sites. At the Brick Shed site it is represented by some smooth-surfaced sherds and one sherd with linear stamping on the outer face and fine fiber tracks on the inner. Another sherd has a suspension or crack-lacing hole. Pottery from the Knoll site is limited to 3 sherds, two of them smooth-surfaced, the other cord-marked. While these samples are hardly reliable time markers, the occurrence of cord marking and linear stamping is interesting, since it suggests parallelism with the Middle Lena sequence, where the interval between the spread of Baikal-like net-impressed pottery (here perhaps represented by the Syalakh find) and the predominance of check-stamping (characteristic of the next period on the Lower Lena) witnesses the importance of linear stamping and cord marking. We are, of course, assuming that the 3 sherds at the Knoll site did not work their way down from the upper level, an alternative which Okladnikov leaves open (1946: 34). In this connection, it might be noted that cord marking is not reported from the upper level of the site.

Suggestive also is the finding of a rim covered with vertical cord marking and accompanied by some chips and a boulder-chip ("kuochai," "tci-tho") scraper near Siktyakh (Okladnikov 1946: 83). It may well fit into this same time interval.

Another probable component of the early Uolba phase is represented at one of the Kestriryungka locations (called "Cape Obukh" by Chard 1956: 406; Okladnikov's Site 85),

which yielded the diagnostic Uolba "file-shaped" point, an end-of-the-blade scraper, an unfinished bifacial side-blade, a lamellar burin, a quadrangular scraper, and some lamellar flakes. No pottery was found, an absence which is not surprising in view of its scarcity in the larger Uolba samples.

Most interesting, finally, is the occurrence of a site apparently representing the early Uolba phase on the Kolyma River at Pomazkino (Okladnikov 1947b; 1955b: 123) where, among other artifacts, typical large trihedral points were found. It is not clear what kind of pottery, if any, occurs at Pomazkino.

4. *Late Uolba.* A later phase is represented by the upper occupation level of the Uolba Knoll site, 2 sites on Lake Kylarsa (Sites 72 and 73), and one site on Lake Zhirkova (Site 71).

The Lake Zhirkova collection is small, consisting of numerous sherds from a single pot and some lamellar flakes. It appears to fit with the Kylarsa and upper Uolba materials on the basis of its fiber-tempered, check-stamped pottery. The temper in the Zhirkova sherds is vegetal, not hair, as is more usual in this kind of pottery, and also contains clay particles.

The upper Uolba materials include fiber-tempered smooth and check-stamped sherds with clay inclusions, lamellar flakes, core burins of the Baikalian kind, a squat bifacial asymmetric point with a concave base (Okladnikov 1946, Pl. 3, 3), a sandstone abrader, an unfinished rectangular side-blade, a chipped semilunar knife, a leaf-shaped point, and a spokeshave scraper.

The 2 Kylarsa sites yielded relatively large samples, and probably for this reason have a representation of bold ("large") check-stamped and rhombic check-stamped sherds in addition to the usual small-check and smooth varieties. A number of linear-stamped sherds were found, and grooved-paddle impressions sometimes occurred with and even over check impressions on some sherds from Site 73. Vessel shape was globular, and decoration occurred in the form of a row of perforations below the lip. Also shared by the 2 Kylarsa sites were lamellar flakes, cores, pebble hammerstones and stemmed lamellar points, partially retouched on the ventral face. In addition, charred birchbark rolls, polyhedral burins of the kind found at Ymyiakhtakh, an end-of-the-blade scraper, a polished adz fragment, a stemmed bifacial point of the Serovo ("Gary-like") type, and a chopper were found at Site 72. Above-ground dwellings are suggested. At Site 73, ceramic traits not specifically mentioned for Site 72 include X-shaped incised designs on the lip and incised pendant triangles on the rim, similar to those noted on the Middle Lena at the Yakutsk Hospital site. An unstemmed lamellar point, a bifacial point with a contracting stem (Okladnikov 1946, Pl. 7, *1*), a squat bifacial asymmetric point (Pl. 7, *4*), of attenuated asymmetry like the previously mentioned specimens from Kullaty and upper Uolba, a spokeshave scraper, a boulder-chip ("kuochai") skin scraper, and a lamellar burin are reported.

Despite erratic differences in inventory probably due to sampling error, the 4 components described undoubtedly represent the same late phase of the Arctic Neolithic, characterized by the predominance of fiber-tempered smooth and check-stamped pottery and the appearance of polyhedral burins and, perhaps, stemmed lamellar points. The first 2 features would seem to align it with the Ymyiakhtakh phase of the Middle Lena.

The late Uolba complex is apparently represented on the lower Kolyma at the sites of Kresty, Petushki, and Labuya. Lamellar flakes, polyhedral burins, lamellar points and stemmed points, as well as linear- and check-stamped pottery occur. Check-stamped pottery is also reported from near the mouth of the Indigir'ka River, at Tatyanino Lake, where it occurred in a hearth with a spear point fragment, a scraper, and a number of bone artifacts. Though land mammals were mainly hunted, walrus is represented by some of the bones.

The easternmost occurrence on record of remains that can be ascribed to the late Uolba phase is at Lake Chirovoye on the Chukchee Peninsula (Okladnikov 1953c). Information on these finds has been given in English by Chard (1955b). Diagnostic are the fragment of a point of attenuated asymmetry, a boulder-chip scraper, and the plain ware associated with the Uolba and Kylarsa complexes, namely a smooth-surfaced pottery with animal fiber imprints caused by the use of hair temper and/or of a fur-covered anvil or paddle. The paste of the Chirovoye sherds was noted to contain grit

and gravel temper, and an example of cracklacing was observed.

An isolated find of presumed Neolithic age (Okladnikov 1947c) from the Kolyma River is of some interest. It is a knobbed adz suggesting the knobbed gouges of the Red Paint culture of Maine (compare Okladnikov 1947c, Figs. 66-7 and Moorehead 1922, Fig. 50).

5. *Other Neolithic Sites.* The Yakitikiveem flints (Okladnikov 1950c; Krader 1952) from the Chukchee Peninsula are hard to fit with any certainty into any of the complexes so far described, mainly because of the small size of the collection, which includes: fragments of what are probably 3 or 4 elongate lanceolate points with straight bases and diagonal parallel flaking, lamellar flakes, and a tongue-shaped polyhedral core. Okladnikov feels that they are older in date than the Chirovoye finds. Their significance, at present, seems to be that they may represent a relatively early assemblage combining the lamellar and bifacial point traditions in the Asian Arctic, the latter being represented by lanceolate "Angostura-like" points. Tying in, as they do, both with the flint industry of previously described ceramic complexes of northern Siberia, and such American manifestations as Denbigh and New Mountain, they are one of several indications that the distribution of lanceolate points with fine parallel flaking on both sides of Bering Straits should be approached as a single problem.

The pottery from Ebetiem (Site 113) remains to be mentioned. There, Okladnikov (1946: 105) found a bifacial teardrop shaped point of a kind also occurring at Malaya Munku, some lamellar flakes, and fiber-tempered sherds decorated with quadrangular-tooth dentate stamping. This mode of decoration is unique as far as the Arctic fiber-tempered pottery is concerned.

6. *Early Bronze.* The Early Bronze period of the Lower Lena is represented by the burials of Bugachan and Ichillyakh (Okladnikov 1946: 71, 98). Burial inventories at both locations include lamellar flakes, bone needle cases, and copper or bronze fragments. Like the upper level at Kullaty, the Bugachan burial contained tree barkers, one of them carved, split-base and split-tip bone arrowheads, and triangular Glazkovo-like points. Also found were an asymmetric triangular chipped knife, of a kind occasionally found in the Archaic and Early Woodland of eastern North America (Okladnikov 1946, Pl. 11, *11*; Maxwell 1952, Fig. 95, 9; Ford and Webb 1956, Fig. 29 *b*), an antler split-base point, a copper or bronze needle, and remnants of fur clothing and sinew thread. At Ichillyakh, finds consisted of a needle case carved in the same rectilinear style as the Bugachan tree barker (a style which Okladnikov compares to Punuk art, 1955b: 175), a similarly carved bone tablet, some mother-of-pearl beads, probably indicating, as in Glazkovo, the use of the Tungus "apron" (Okladnikov 1955a: 147-9), bone needles, and a few relatively thin, sparsely quartz-tempered, smooth-surfaced sherds with modeled (notched fillet) decoration.

Problems of Chronology

An alignment of the 3 regional sequences here examined is given in Figure 2. It is in general agreement with Okladnikov's statements on the subject, but since these have been brief and unsystematic, a short discussion of the problem will have to be attempted here. The reader is cautioned that the opinions advanced are the present writer's, and are therefore handicapped by lack of first-hand acquaintance with the materials.

Features occurring in the Baikal sequence and in the middle and/or Lower Lena may be grouped as follows in roughly chronological order:

Group 1. Traits first represented in the Baikal before or in Serovo times: pottery that is granular tempered, net impressed, near perforated or perforated on the rim, occasionally incised or dentate stamped; the shouldered adz;* squat asymmetric-triangular teardrop shaped* and contracting stemmed* bifacial points; bifacial rectangular side-blades,* and bone needle cases.*

Group 2. Traits not reported any earlier than Serovo in the Baikal-Upper Lena sequence, but known in that period: linear stamping; fabric impression; cord marking; the lobate ax or hoe; the sandstone arrowshaft straightener; notched pebble sinkers; pebble hammerstones; diagonal parallel flaking; and polyhedral burins.*

Group 3. Traits first known in Kitoi: the boulder-chip (tci-tho) scraper; triangular points

* Traits marked with an asterisk appear relatively later in the north, or fail to occur in one of the areas.

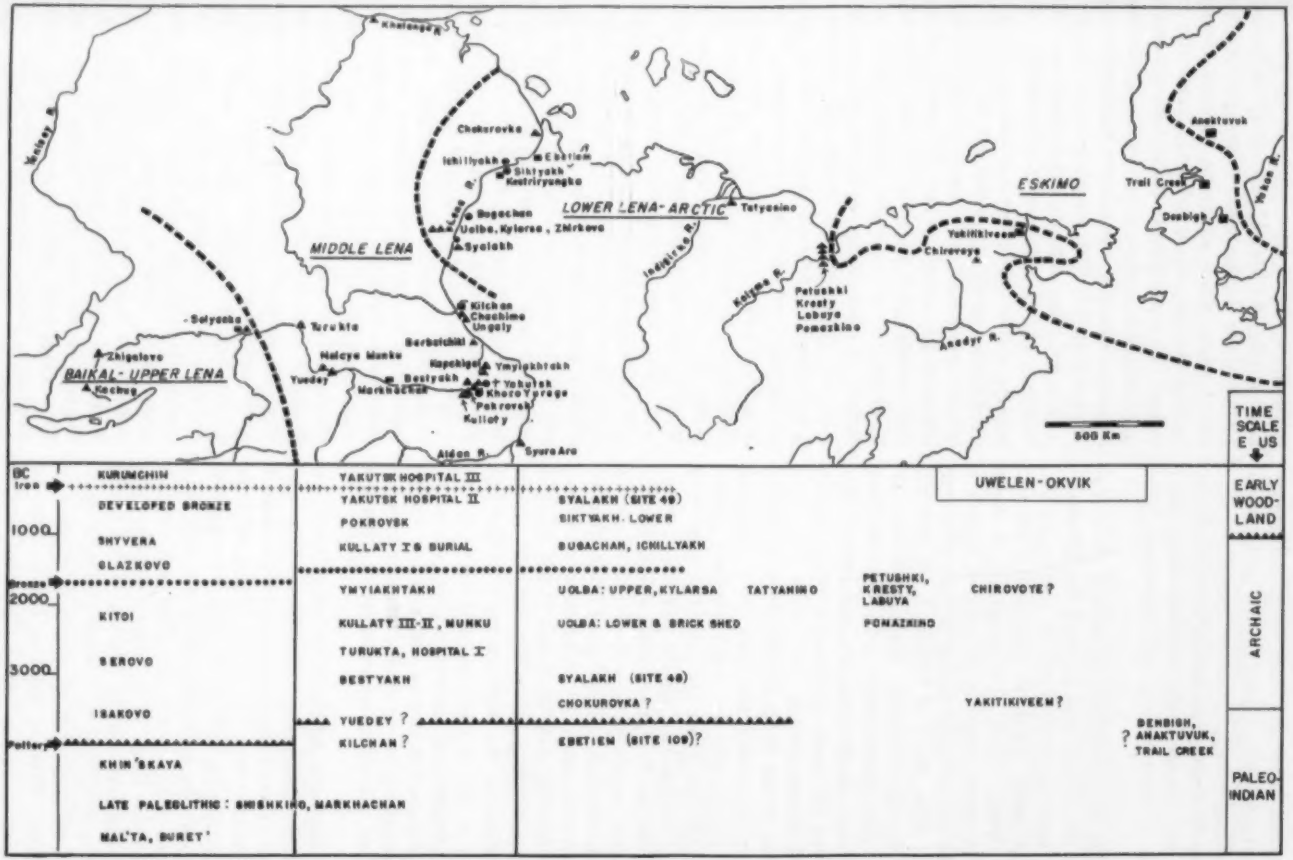

FIG. 2. Time and space relationships in the Lena Basin. Chronological columns are placed approximately under the areas of the map to which they correspond. Data are from Okladnikov, but the present author must assume some of the responsibility for these particular alignments.

with straight bases; the bone whistle; the chipped semilunar knife; lunate or oval side-blades; and the tree barker.*

Group 4. Traits first identified in Glazkovo: copper and bronze; pale nephrite rings; basal thinning of flint points; and split-base bone points.

Tracing the distribution in time of these features in the Middle and Lower Lena chronologies, a general parallelism to events in the Baikal becomes apparent, particularly on the Middle Lena. With the exception of traits marked with an asterisk, features of Group 1 are those of the early pottery phases in either or both areas; traits of Group 2 are first on record in the Turukta, Kullaty-Munku, or Early Uolba phases; traits of Group 3 are first noted in the Kullaty-Munku and Late Uolba complexes; the traits of Group 4 occur first in the Early Bronze period.

If some of the debatable nonceramic assemblages in the Arctic are truly early, diagonal parallel flaking must be dated relatively earlier in the sequence. If we are correct in suggesting an Early Uolba date for the previously mentioned Siktyakh find, the appearance of the tcitho scraper must also be assumed to be earlier on the Lower Lena than that of other traits of Group 3. Otherwise, all the exceptions to the horizon scheme outlined above (traits marked with an asterisk) involve features that appear to lag behind in the northern areas, or that fail to occur in one of them altogether. It cannot be overemphasized, however, that many of these absences are very probably due to inadequate sampling, our coverage becoming progressively less reliable as we move away from the Baikal.

The alignment in Figure 2 is predicated on a "horizon" assumption, that is, a rough synchronism of *most* traits in *most* of their earliest noted occurrences. The truth of the assumption is naturally difficult to determine in the absence of direct dating. However, the very ease with which such an alignment can be made in the Lena valley argues against protracted lags between the 3 areas, which could be expected to lead to a more extensive jumbling of the sequence of events in relation to the Baikal. Further support for it may be found in correspondences between the 2 northern areas in traits not shared with the Baikal. Thus, Kullaty-Munku shares with Early and/or Late Uolba such items as fiber-tempered paste, check stamping, pendant triangle incised designs on vessel walls, and the pit house. The polyhedral burin first appears in Ymyiakhtakh and in Late Uolba. Split-base, split-tip bone arrowheads are confined to the Bronze period in both areas.

We are thus implying fairly rapid diffusion between the 3 areas over considerable distances, a phenomenon to which, as Meggars (1955) has recently pointed out, archaeologists are becoming increasingly acclimated. By rapid diffusion we simply mean diffusion at a rate fast enough not to show a noticeable time gradient by our present rather crude time scales. A century or two, after all, is a long time to almost anyone except the student of past events. In terms of a time scale as rough as the one now justified for eastern Siberia, a century can hardly be taken into account. However, an over-all gradient (presumably going up from south to north) can easily be injected into the alignment by shifting upward the right hand (northern) margin of our chronological table and making a parallelogram or trapezoid out of the rectangle in Figure 2. Such a procedure must be considered as preferable to dating any phase by the latest adjacent period to the south of it which it resembles, as is sometimes advocated. The latter procedure has the inherent fault of assuming a 1 to 1 correspondence between periods and can hardly stand critical scrutiny, since the periods in question are arbitrary and largely accidental creations of the investigator, and their duration is unknown. Thus, while we have avoided drawing period boundaries in Figure 2 so as not to create an impression of spurious accuracy, trait correspondences would justify postulating some overlap in time between Kullaty-Munku, Serovo, and perhaps Early Uolba, and very probably Late Uolba and Kullaty-Munku. As already stated, allowances of a century or two either way are implicit in a scheme as gross as the one to which we are at present limited. Therefore, we do not feel compelled to express in graphic form the specific and relatively minute overlaps suggested above, especially since future information is likely to modify our conclusions extensively. Yet, the probability of such overlaps should be kept in mind if one is to avoid

* Traits marked with an asterisk appear relatively later in the north, or fail to occur in one of the areas.

the mechanistic procedure of dating any phase in toto by its latest southern analogies, and compounding the lag artificially created thereby as more sequences are compared in series.

Lest the relatively "long" chronology suggested herein appear mainly derived from a priori considerations, it must be made clear that Okladnikov repeatedly emphasizes internal evidence from the Lena valley that points to relatively unobstructed and rapid culture flow in the area in prehistoric times. Thus, Early Iron age pottery at Siktyakh, on the Lower Lena, is virtually identical, despite the distance of 2500 km. between the 2 sites, to that of Mukhtuya, on the southern confines of the Middle Lena area (Okladnikov 1946: 152). The pale nephrite ring found in the Early Bronze level of Kullaty may actually be a trade piece from the Baikal, or, if a local imitation, is still highly suggestive of contact between, and the contemporaneity of the 2 complexes (Okladnikov 1955a: 189). The white slate knife from Chokurovka, Baikalian in shape and material, suggests contact during the Neolithic over an even greater distance (Okladnikov 1946: 130).

Absolute chronology largely hinges on Okladnikov's guess-dates for the Baikal. Of those concerning us here, only the Glazkovo (1700 to 1300 B.C.) and the Kitoi (second half of the 3rd and the beginning of the 2nd millennia B.C.) dates are founded on comparative considerations (Okladnikov 1950a: 130-8). They appear tenable, though early for some tastes. Pre-Kitoi estimates are guesswork, and would place the appearance of pottery in the Baikal some 1000 years later than the earliest date Ward (1954: 134) would allow for his "hypothetical Early Neolithic" in China, and would suggest a ceramic time-depth in the Baikal of an order comparable to that implied by some radiocarbon dates for Japan (Johnson 1951, Samples 548 and 603). Both these considerations impart an air of plausibility to Okladnikov's absolute time scale, particularly in the light of recent experience with radiocarbon dating which has tended to show that, when applied to dates, the adjectives "conservative," "late," and "correct" are not as often synonymous as was once fashionable to assume.

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May, 1957

NOTE: Part II, concluding this article, will appear in the July issue. It will discuss North American parallels to the Old World data here summarized.

Nearly 15 years ago Margaret W. Harrison put on paper some comments based on her many years of experience writing and editing for the Carnegie Institution of Washington's archaeological program. What she said then is just as pertinent today. The following excerpts are from her article "The Writing of American Archaeology," AMERICAN ANTIQUITY, Vol. 10, No. 4, pp. 331-9, April, 1945.

In the annals of American archaeology lie the records of achievement wherewith to trace the remote heritages of our western civilization. Yet these accounts often repel both student and general reader by the quality of expression, which beclouds with dullness and diffusion material of high value. That archaeological writing need not be unattractive I am convinced, despite much proof of indifference to the value of style in communicating substance, for good writing is but the technique of conveying to others the fruits of research that archaeology seeks to add to the sum of knowledge.

A double task of analysis and synthesis faces everyone who writes about the past. Accumulation of materials, engrossing as that may be, is . . . only the first step in constructing the outline of early cultures. After collecting and sorting the evidence, the archaeologist is under obligation to use and shape it. . . .

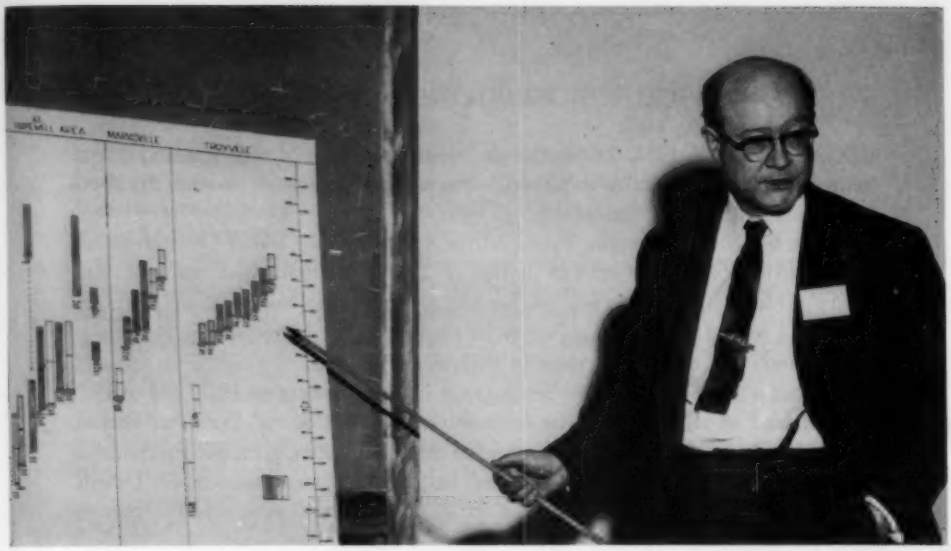
As the archaeologist seldom lacks the prime requisite of good writing — a definite purpose — his first objective is clarity. Slovenly reporting is comparable to superficial excavation; to inexact notes on position, measurement, and direction; to careless and incomplete references. Slipshod writing tends to cover up slipshod thinking; obscure writing, to emanate from confused and unripe thinking. It is dangerously easy, by disorderly and hazy expression of details, to slur over inaccuracies and omissions. . . .

Good writing is difficult. It demands patience and effort. No one complains because the ability to take good photographs, identify potsherds, or determine building strata requires practice and study, yet the archaeologist is apt to look upon writing as a mere knack, endowed by nature. Irked by this unfamiliar mode of expression — unfamiliar because time for its cultivation is scarce — he takes refuge in thinking that techniques of preparing a paper are unimportant, in believing that anyhow will do. . . .

Once convinced that if material is worth publishing it must be communicated effectively, the investigator is confronted by the specific act of writing: planning, writing, revising. If certain of what is to be said and to whom, he is ready to lay out the scheme of the report. Not a few papers seemingly skip this stage in the procedure, plunge directly into the second, and ignore the last, all in the innocent belief that spontaneous expression naturally bubbles into well-ordered prose. But, because composition is a progression, it has a beginning, a middle, and an end. There is no successful escape, therefore, from deciding what will be placed in the introduction, in the development, or in the conclusion.

An introduction exists to put the subject before the reader. It should have definite connection with the subject and should promise only what will be fulfilled in the text. At this point archaeological reports use to advantage a statement not only of the problem but of the main results and their general significance, so that the reader will have a background against which to judge the details that follow, instead of being thrown into a mass of unrelated minutiae. . . .

Well-written accounts of excavations and their significance would win for archaeological studies a wider audience. At the present time, when knowledge has so increased that scientific advances are known more and more by only a few researchers, clear, simple, and interesting statements of such work would broaden its distribution. The importance to a liberal education of a knowledge of early civilizations needs no pleading, but dissemination of this knowledge is in straits. Much of our learning is confined to the specialist, and it will remain inaccessible to the general reader as long as the style of its writing continues to be tedious and arid, not because the subject is recondite. This is not to urge that archaeological writing take on the tone of a mystery thriller or a thundering adventure (though archaeology has elements of both), or that it strain to become literary, but to persuade those who write from pinnacles of incomprehensible erudition, who denounce interesting and attractive writing as "popular," that what is understandable to an intelligent layman is not necessarily unscientific. . . .



1957 VIKING MEDALIST IN ARCHAEOLOGY

Chosen by the Society for American Archaeology

JAMES B. GRIFFIN

One of the most productive and influential archaeologists working in the American field, James B. Griffin early stimulated important studies through his analysis and systematization of the aboriginal ceramics of eastern North America. He has an unsurpassed knowledge of the form, range, and distribution of artifact styles in North America, and has been indefatigable in his examination of collections both in museums and in the hands of amateur archaeologists. Through his innumerable contacts with both amateur and professional archaeologists and by his teaching at the University of Michigan he has exercised a great influence in promoting the aims of scientific archaeology and encouraging able students. Since the 1930's his syntheses of eastern United States prehistory have been invaluable. More recently his interest in coordinating the results of research on several continents show promise of fulfillment.

1957 Viking Medalist in General Anthropology, Margaret Mead
1957 Viking Medalist in Physical Anthropology, Raymond A. Dart

Previous Viking Fund Medalists in Archaeology: A. V. Kidder, 1946; J. O. Brew, 1947; A. D. Krieger, 1948; H. L. Movius, Jr., 1949; E. W. Haury, 1950; F. H. H. Roberts, Jr., 1951; Alfonso Caso, 1952; G. R. Willey, 1953; W. D. Strong, 1954; J. E. S. Thompson, 1955; and J. B. Bird, 1956.

VICTOR ROSE STONER — 1893-1957

On August 20, 1957, the Southwest lost one of its minor prophets, and a large company of people in many walks of life lost a cherished friend, through the death of the Reverend Victor Rose Stoner.

Born in 1893, at Victoria, Texas, Victor Stoner was the son of Overton Stoner and Zilpa Rose Stoner, both also natives of Texas. He graduated from the University of Dallas in 1914 and was teacher and principal in schools at Miami, Arizona, from 1917 to 1921. He was a Fellow in English at the University of Arizona in 1921-22 and received an M.A. there in 1937, in archaeology.

Stoner studied at St. Mary's Seminary at La Porte, Texas, in 1923, and in 1925 was ordained as a priest. He was first appointed to All Saints' Parish in Tucson, and during the years that followed served in many capacities, principally in parishes and schools in Arizona. From 1951 until his death he was pastor of St. Dennis' Church on his family's ranch at Victoria, and at the same time was Professor of History at Loretto College in San Antonio.

One of the most colorful episodes in Father Stoner's career was his celebration of Mass at the altar of the ruined Church of San Bernardo de Aguatubi in the Hopi country of northern Arizona. San Bernardo, a mission church built by the Franciscans about 1630, flourished until the Pueblo Revolt of 1680, but was never thereafter occupied. During the 1930's the church and village of Awatovi were excavated by the Peabody Museum of Harvard University, and Father Stoner was a frequent visitor there in the course of his travels as a chaplain of the C.C.C. He carried with him an altar stone, vestments, and other necessary items, and on September 5, 1937, celebrated the first and only Mass at that spot since mid-August, 1680.

Father Stoner was a dynamic member of the Arizona Archaeological and Historical Society, a co-founder of the *The Kiva* and its first editor, and the society's president in 1938-39 and from 1943 to 1948. As he said afterwards, one of the ulterior motives in founding *The Kiva* was to provide a vehicle in which Byron S. Cummings might publish his voluminous archaeological material — an objective at least partly realized.

A careful historian and a severe, though usually just, critic of others, he was an acknowledged authority on the Spanish missions of the Pimería Alta and an avid collector of archaeological specimens and historical documents. His valuable library of rare books and manuscripts he left to the Arizona State Museum, where it will have great usefulness to the institution and the public.

Father Stoner's life has marked, in his beloved Arizona, a broad and enduring pathway which will not be obliterated by his untimely death.

WATSON SMITH

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RICHARD FOWLER VAN VALKENBURGH — 1904-1957

Historian, anthropologist, and long-time friend of the Navaho, R. F. Van Valkenburgh died at Window Rock, Arizona, June 19, 1957. His sudden death came as a shock to his many friends, Indian and non-Indian, and to the Navaho Tribe by which he was employed.

Van, as he was widely and affectionately known, was born in Newark, California, graduated from the Compton High School, and studied at the University of California. Much of his training in history and anthropology derived from his close association with R. L. Moodie, J. P. Harrington, E. L. Hewitt, and F. W. Hodge.

In 1925 he married the former Elsie Condon of California, from whom he was divorced in 1931. A daughter, Mrs. Mary Hinojosa, survives from this marriage. In 1938 he married Ruth Williams of Oklahoma, who, with a son, Richard John, survives him.

Van worked and lived among many Indian groups in California, Arizona, New Mexico, and elsewhere. From 1929 to 1934 he studied the San Luiseño, Pima, Simo'mo, Ventureño, Hopi, and Mohave. From 1935 until his death his major interest remained the Navaho, with whom he did his most important work.

From 1935 to 1941 he was employed by the Bureau of Indian Affairs to head a social and economic survey of the Navaho Reservation, during the course of which he acquired the familiarity with the region that was to make him so valuable to the Tribe as an expert witness and collaborator in the development of the Navaho claims case as well as in the solution of many knotty land problems. From 1952 until his death Van was employed by the Navaho Tribe, in charge of its Department of Land Use and Surveys.

Through the years Van accumulated a voluminous body of notes and manuscript material, in addition to knowledge he did not commit to writing, and it was his intention to spend his later years in writing. From 1936 onward occasional brief, but valuable, scientific articles on such subjects as Navaho common law, shrines, and tribal history and government, were published by the Museum of Northern Arizona, the Southwest Museum, and the Bureau of Indian Affairs. For the public at large he wrote interestingly and frequently in *Desert Magazine* and *Arizona Highways*.

At a memorial service held on August 6, 1957, the Navaho Tribe recognized Van's devotion to the cause of the Navaho people and adopted a formal resolution expressing appreciation of his invaluable services to the development of the Navaho claims case.

He was the principal moving force in the establishment of the Navajo Tribal Park Commission and the Navajo Archeological Society. Van was keenly aware of the wealth of archaeological material in the Navaho country, and exerted his influence on the Tribal Council to protect it for posterity. In fact, the location and study of ancient Navaho hogan sites is an important aspect of the claims case and much of Van's work from 1952 to 1957 was archaeological research.

Van's death is a great loss, and he will long be remembered by his Navaho as well as his non-Navaho friends.

ROBERT W. YOUNG

FACTS AND COMMENTS

CENTRAL NEW MEXICO PALEO-INDIAN CULTURES

In the last decade the middle Rio Grande area of New Mexico has produced considerable cultural evidence which indicates the presence here of the paleo-Indian and related cultures. Finds of the classic hunting varieties are rare in the Rio Grande valley itself, although a scattering of Sandia, Clovis Fluted, and Folsom points has appeared. Far more common are sites of Cochise-like character, usually evidenced by deeply buried fire hearths, milling stones, manos, and occasional projectile points. Several groups of these sites have been studied in recent years and some of the fire hearths have been dated by the radiocarbon method. A burial possibly connected with these early sites has also appeared.

The first widespread evidence of preceramic, gathering cultures in the middle Rio Grande drainage was found during the summer of 1950 when Florence Hawley Ellis, John M. Campbell, and the present authors surveyed a number of separate sites in the central Rio Grande drainage. South of Albuquerque, 2 definite site areas exhibited almost identical lithic material. The smaller of these was located near La Jara, a village situated in the Rio Grande valley, 50 miles south of Albuquerque. Here deep blowouts cut into underlying sediments of old river terraces and exposed a number of fire hearths. Although the cultural material associated with the hearths was meager, several one-hand manos and basin-shaped milling stones indicated a seed-gathering economy.

A more productive site area was encountered in the very deep erosional cuts of the Rio Puerco of the East, 25 miles to the south and west of Albuquerque. The principal site area is located 5 miles downstream from the Suwanee railroad station. Approximately a dozen arroyo lenses 5 to 15 feet in diameter were discovered in a series of small side arroyos that drain into the east side of the Rio Puerco (Hibben 1951). The lenses are elliptical in cross section and are located 12 to 30 feet below the present surface. Once again the characteristic one-hand manos and basin-shaped milling stones were found in direct association with the hearths. As at La Jara, no pottery was found with the hearths, and due to the depth of the charcoal lenses, the sites were considered preceramic rather than nonceramic. No projectile points were found at either of the 2 site areas, and the only other diagnostic artifacts were several rough stone implements which might be either crude choppers or scrapers.

On the Atrisco grant, located just east of the city of Albuquerque, Ellis and Campbell found several dozen small sites on or near the surface, that appeared to be characteristically different from the known cultures in the area. The investigators concluded that the material should be known as the Atrisco focus of the San Pedro stage of the Cochise culture, because of the similar point typology and the presence of a seed-gathering economy again evidenced by one-hand manos and basin-shaped milling stones (Campbell and Ellis 1952).

A major site area of similar material lies southwest of Santa Ana pueblo on the Jemez Wash, a tributary of the Rio Grande. Southwest of the pueblo and of U.S. Highway 44 is a region of gentle rolling hills, cut by arroyos that vary in depth from 3 to 20 feet. The arroyos begin at the base of a sandy ridge approximately 1 mile from the highway and gouge the land in a northeasterly direction for 2 miles until they connect with the Jemez Wash. The concentrated site area is located among the arroyos southwest of the highway. Downward cutting has been stopped for the last few years and drifting sand and abrasive wind action have in spots disintegrated the previously vertical banks. At the same time surface erosional action had scarred the area with deep blowouts with accompanying sand dunes. Both the arroyo cuts and the deeper blowouts have revealed charcoal hearths with associated lithic artifacts resembling the San Pedro and possibly the Chiricahua stages of the Cochise culture.

Approximately 50 well-defined charcoal lenses have been located in 2 central arroyos that cut through the concentrated site area (Agogino 1952; Agogino and Hester 1953). The lenses vary from 1 to 20 feet in length and from 1 inch to 2 feet in thickness, and are found at depths from 4 to 19 feet below the present surface. The lenses generally are found to be underlying one and often 2 well-defined silt deposits which are in turn separated by and overlain by a loose sandy earthen fill. Apparently the hearths were covered by the windblown redeposited fill of dry periods and the darker silt of brief moist periods.

In addition to the arroyo lenses, 125 hearths have been found on the surface, generally on the sloping surfaces of disintegrated arroyo banks or in hillside blowouts. Both surface and arroyo hearths are often outlined by a ring of sandstone and quartzite rock fragments. The artifacts found in the surface sites and the arroyo sites appear to be homogeneous culturally and the accumulated material will be treated as a unit.

Over 50 one-hand manos have been recovered from the hearths. Of these approximately 80% were of quartzite, 10% of basalt, and 10% of sandstone. Three-quarters of the manos found show usage on a single surface, the others on both surfaces. Associated with the manos were 14 grinding slabs or milling stones with oval basins, 10 shallow and 4 deep. One mortar was recovered but no pestle was found.

The 63 points from this site may be grouped into 3 categories. The first group consists of unstemmed oval and lanceolate chipped artifacts (Fig. 2 *a*) that may have been used either as knives or projectile points. They are approximately 6 cm. long, pressure chipped, and usually of obsidian or quartzite. Some of the points have blunt tips, apparently reworked after the original tip had broken. Other points in this category show retouch on one or both cutting edges suggesting that the tool had been used as a knife. In all probability these oval shaped artifacts had a dual function and were effective either as knives or as projectiles.

The second type of point has a triangular body, rounded barb, broad lateral notches, and an expanding stem culminating in a rounded base (Fig. 2 *b*). Typologically it is almost identical with points from the San Pedro level of the Cochise culture and with similar artifacts found in the upper portion of the moist zone of the Ventana Cave midden (Haury 1950). These points are pressure flaked, well-chipped, and predominantly of quartzite. Three of these points were found in situ in deep arroyo lenses.

The final point type (Fig. 2 *c*) closely resembles projectiles from the Lobo phase of the San Jose complex as exhibited near Grants, New Mexico (Bryan and Toulouse 1943), and extending throughout the entire San Jose river valley (Agogino and Hester 1956). The points at Grants are crudely chipped, less than 3 cm. long, thick in cross section, and have squat, triangular bodies, serrated edges, broad but shallow lateral notches with square and indented bases. At the Santa Ana sites a number of points of the same type occur with the exception that only about 25% of the Santa Ana projectiles are serrated.

The Lobo phase of the San Jose complex has not been dated by the radiocarbon method, but geologic evidence presented by the late Kirk Bryan suggests that this phase existed in the first millennium B.C. and may have extended into the early centuries A.D. According to recently released radiocarbon dates (Crane 1956) for Santa Ana, the Lobo and Santa Ana groups were roughly contemporaneous and might well have influenced each other. As at all previously mentioned site areas, the San Jose exhibits one-hand manos and basin-worn milling stones.

Only at Santa Ana have the middle Rio Grande Cochise-like sites produced adequate samples for radiocarbon dating. H. R. Crane of the University of Michigan Memorial Phoenix Project Radiocarbon Laboratory very kindly dated the samples submitted. We are indebted to Crane and to James B. Griffin, Director of the Museum of Anthropology of the University of Michigan, for their help in this important work. Three charcoal samples were taken from deep lying hearths along the arroyos in the concentrated site area. The earliest age was reported from a hearth buried 5 m. below the present top of the arroyo. This hearth had a diameter of over 3 m. and was ringed with large limestone slabs. The purpose of this enclosed hearth is unknown. Charcoal from this hearth was dated at 3300 ± 700 years (Sample M-249). The most deeply buried sample (M-254) of those dated came from a culturally sterile hearth 6 m. below the present surface, and had an age of 2900 ± 250 years. Sample M-298 came

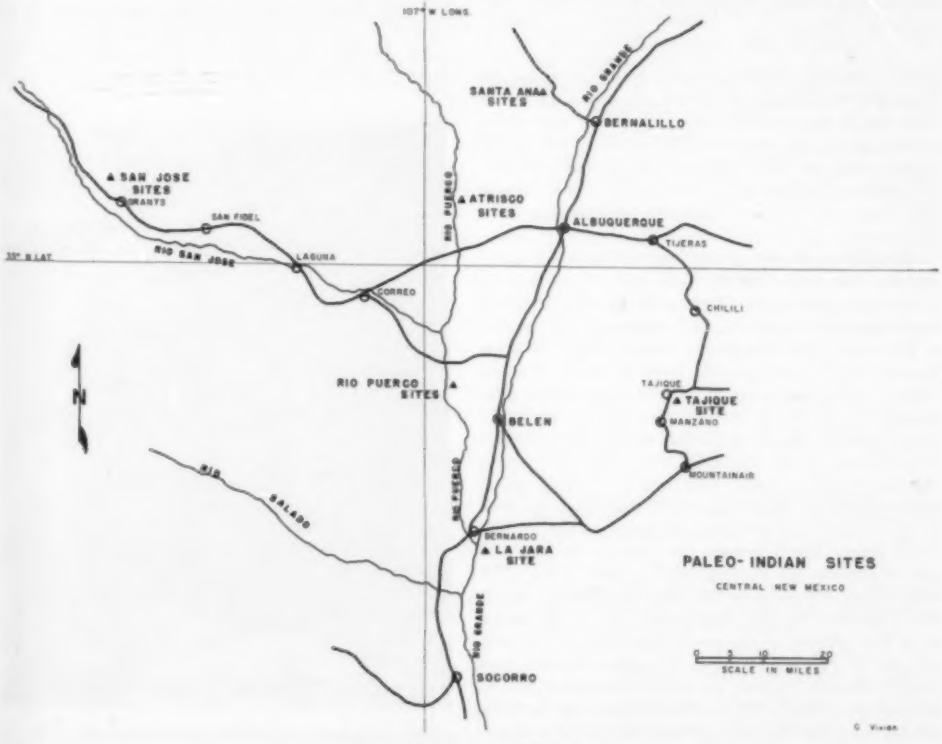

FIG. 1 [Agogino and Hibben].

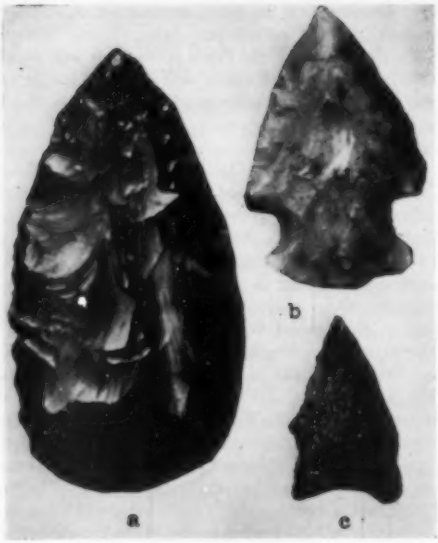

FIG. 2 [Agogino and Hibben]. Chipped points from central New Mexico. *a*, lanceolate; *b*, "San Pedro" type; *c*, "Lobo" type.

from a relatively shallow charcoal lens 3 m. below the surface in the same arroyo as the previous 2 specimens. This hearth has produced one fragmentary bone point, 3 lithic projectiles, and several one-hand manos. It was given an age of 3100 ± 500 years. These 3 samples give a possible age for the arroyo sites of from 2600 years to 4000 years with the most probable age centering about 3000 years.

In addition to the deeply buried charcoal lenses 3 samples from surface hearths were sent to the University of Michigan laboratories. Sample M-250 was taken from the surface hearth thus far producing the largest amount of lithic material; it was given an age of 2500 ± 350 years. Sample M-253 was removed from a surface charcoal deposit within 125 yards of the previous sample. This hearth is over 10 m. in diameter and is the largest surface hearth uncovered to date in this area. Sample M-253 has an age of 2600 ± 300 years. The final surface sample (M-252) at Santa Ana, from a culturally unproductive peripheral hearth located ½ mile north and west of the concentrated site area, was given an age of 2180 ± 250 years. The 3 samples from surface hearths thus give a possible age of from 1930 to 2900 years. The surface sites average some 500 years less than the deeply buried hearths, but this discrepancy is not as significant as it first appears as the arroyo lenses were purposely selected for their depth while the surface hearths were picked primarily for their size or cultural affiliations. As the present surface in this area has recently been radically altered by erosion the term "surface site" has little meaning.

At the Santa Ana sites the arroyo lenses appear at several levels, some hearths clearly overlying the remains of earlier campfires. None of the hearths seem to indicate by their size that they were used over a long time period. From this we may infer that the group that once inhabited this area was at least seminomadic and returned to this location periodically over an extended period of time.

Also of interest and apparently in the same category of finds is a discovery made in 1954 by M. Martinez of Manzano, New Mexico. Mr. Martinez discovered a burial (Fig. 3) eroding out of the bank of an arroyo below the protohistoric and historic ruin of Quarai near the small town of Tajique. The arroyo is known locally as the Tajique Wash. The burial, when brought to our attention by Martinez, had already been partially washed out and partially removed by Martinez himself. The skull and upper vertebrae were already missing. Portions of the lumbar vertebrae, pelvis, and lower legs were, however, still in place. The skeleton is that of a child 10 years old. It lay flexed on the left side.

Inasmuch as the lower legs were in place the exact location of the burial was not in doubt. The pit in which the burial occurred could be traced some 25 cm. upward to a dimly marked humus horizon and unconformity, the second or lowermost of two such. The burial level itself is approximately 2.5 m. below the original level. As the surface is considerably eroded here during the drought years, this level has been reduced in recent times. The depth itself is of only secondary significance, as arroyo

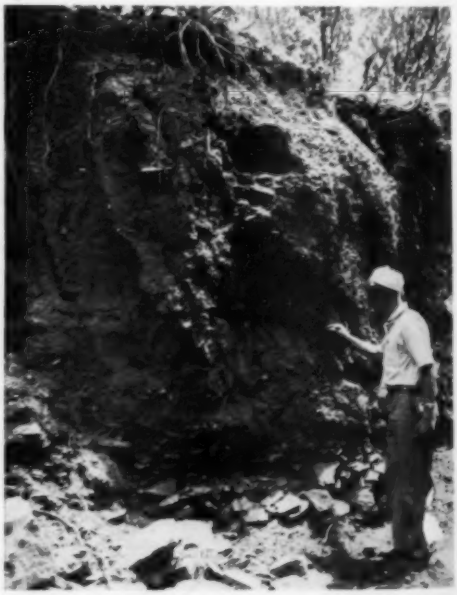

FIG. 3 [Agogino and Hibben]. The location of the Tajique Wash burial, central New Mexico.

sedimentation in this area sometimes occurs very rapidly during a drought cycle. However, the close proximity of several charcoal lenses and some relatively well-prepared fire pits lined with stone fragments would indicate that the burial was contemporaneous with this occupation. One of the stone-lined fire pits is a little less than 4 m. up the arroyo from the burial and at the same level. A series of hearths without stone lining occurs across the arroyo and downstream. In association with these charcoal lenses were found a milling stone and 3 one-hand manos. The milling stone, with a circular, slightly concave milling surface, and the manos are of the usual type associated with deeply buried sites such as those in the Puerco group southwest of Albuquerque and in the Santa Ana site region.

Of especial interest were the accompaniments of the burial. Three artifacts were found by Martinez, according to his description, in the vicinity of the pelvis. Two of these are points (Fig. 4 *a*, *b*) suggestive of early types in their outline and shaping. The smaller of the two has well-developed basal thinning almost amounting to fluting. Neither is at all similar to the projectile types from the Santa Ana sites. Also in the pelvic region of the burial was a small cylinder of antler, well-rounded and beveled at the ends, slightly less than 8 cm. long and 2.8 cm. in diameter. It is drilled longitudinally with an even bore. There were also found in place near the pelvic region 3 pieces of red ocher totaling 15 ounces.

Examination of the deeply buried sites near Tajique and Quarai shows a series of levels of charcoal lenses and also 2 old soil horizons. Three of the stone-lined hearths are associated with the second, or lowermost, of these 2 horizons. Several charcoal lenses occur a meter or more below the second humus layer or soil horizon. Potsherds, common in the area because of the proximity of the site of Quarai, are lacking below the uppermost soil horizon. Efforts will be made to secure a series of radiocarbon dates from the various charcoal lenses to establish a sequence.

From the distribution of these sites and from the concentration of charcoal lenses and hearths within the site areas, a clearer picture of this type of early life in central New Mexico is taking shape. The settlement pattern was that of loosely organized and seminomadic groups which occasionally camped together in concentrated areas. Shelters were perhaps sketchy jacal frames with skin coverings. Gathering was the basis of the economy, with hunting as a supplement. The climate of the time approached the modern and the few associated animal bones are of modern species. Additional burials in undoubted association with these gathering-hunting fire hearth sites would supplement our knowledge considerably.

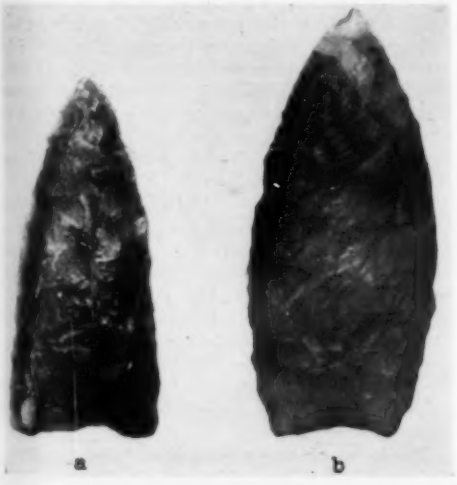

FIG. 4 [Agogino and Hibben]. Chipped points found with the Tajique Wash burial. *a*, 7 cm. long; *b*, 8 cm. long.

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April, 1957

SOUTHERN CULT MANIFESTATIONS ON THE GEORGIA COAST

It has been 15 years since Phillips (1940) first segregated certain late exotic elements from the Southeastern United States and attempted an analysis of them with respect to their cultural position and origin. Waring and Holder (1945) studied these materials a few years later with the result that the entire assemblage was defined in terms of a ceremonial complex. Both of these papers and a subsequent one by Krieger (1945) treated the Southeastern Ceremonial Complex in terms of the whole of this area. Since then there have been few attempts to discuss the Cult with respect to its localized manifestations and in terms of the localized relationships to the broader ceremonial assemblage. An exception to this statement is to be found in a paper by Goggin (1947: 275-6). In it, an effort is made to recognize and define the late ceremonial pattern to be found in a specific area, the Glades area of Florida, and to relate it to the broad Cult picture.

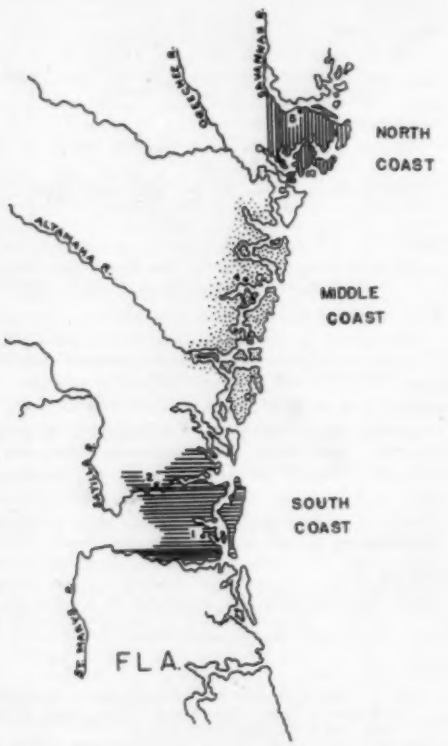

FIG. 1 [Larson]. Map of Georgia coast, indicating the 3 areas of Cult manifestations. Locations of sites mentioned in text are (1) Mound at Fairview, (2) Mound at Woodbine, (3) Creighton Island site, (4) Pine Harbor site, and (5) Irene site.

It is my intention here to examine the Cult manifestations in another marginal area of the Southeast, that of the Georgia coast, in an effort to obtain a somewhat wider perspective of the over-all Cult problem.

On the Georgia coast the Cult falls in the last purely prehistoric period, and can be given a terminal date of about 1565, for in that year the Spanish began their intensive occupation and missionary activity in the area. None of the sites which have produced Cult material here have any European contact items associated with the Cult elements. Apparently the missions with their priests were successful in removing the aboriginal ceremonial practices, or at least subordinating them to Spanish Catholicism, for we find no evidence of pre-Spanish native religion either archaeologically or in the documents at the end of the 16th Century.

Three archaeological areas can be recognized on the Georgia coast during the late prehistoric period (Fig. 1): the northern area, centering around the Savannah River delta and characterized by the Irene complex (Caldwell and McCann 1941); a middle area embracing the territory from the Ogeechee River south to the Altamaha River delta, and characterized by the Pine Harbor complex; and finally a southern area situated between the Satilla and St. Marys Rivers and characterized by the northern St. Johns complex of Florida. There is Cult material from all three of these areas, but the areas are distinct in so far as the Cult manifestations of each are concerned.

Northern Area. Our understanding of this area, as well as the period under immediate discussion, is based upon data obtained from the Irene site (Caldwell and McCann 1941). At Irene the readily recognized ceremonial items include a temple mound, a mortuary building or temple, engraved and stippled conch shell gorgets, clay pipes with Cult features, and conch shell bowls. There is a total lack of distinctive, ceremonial ceramics, which is surprising when one considers that on most late Southeastern sites such pottery is anything but rare. The ceramic types which are associated with the Irene complex are Irene Filfot Stamped, Irene Incised, and Irene Plain. These types all approximate the Lamar types of central and north Georgia, in both vessel shape and decorative technique. All of these types seem to have been used as utility wares.

The Cult motifs found at the Irene site were very few and extremely rare in occurrence. The most common Cult motif found at this site is the cross. It appears almost exclusively as a decorative element on stamped pottery (Caldwell and McCann 1941, Fig. 20). Actually this motif is probably valueless in terms of the analysis of Cult symbolism at the site because of its association in a nonceremonial context on utility ware. In this instance, we no doubt have a Cult symbol which has been used solely as a decorative element without regard to its ritual connotations.

The forked eye may possibly be included in a list of Cult symbols from Irene, although again this is extremely tenuous. On the summit of the next to the last construction phase (Mound 6) of the large temple mound at

Irene is a fire basin in association with the posthole pattern of a temple. This fire basin was encircled by a gutter or drain with 3 extensions (Caldwell and McCann 1941, Fig. 8). In appearance, this fire basin-gutter arrangement resembles a forked eye.

Other Cult elements at Irene include the coiled rattlesnake incised on a shell gorget, and what appear to be rather crude crosses and sun symbols stippled on shell gorgets. Similar gorgets also appear in the tidewater Potomac area of Virginia (Schmitt 1952: 63, Fig. 23 E). These stippled gorgets are produced by a drilled dot technique which seems to have its center in the coastal areas of the middle Atlantic states (Schmitt 1952: 69). The rattlesnake gorget is not distinctive in itself except insofar as it relates to similar items which have been found on late prehistoric and even historic sites in the Southeast.

A single pottery pipe from Irene bears some relationship to the Cult in that it is modeled in the shape of a monolithic axe (Caldwell and McCann 1941, Pl. 18 *d*). This particular pipe form is rather common and is characteristic of very late prehistoric and historic sites in the Southeast.

The presence of the temple mound and the mortuary temple at Irene are not in themselves indicators of a specific ceremonialism connected with the Cult, but they

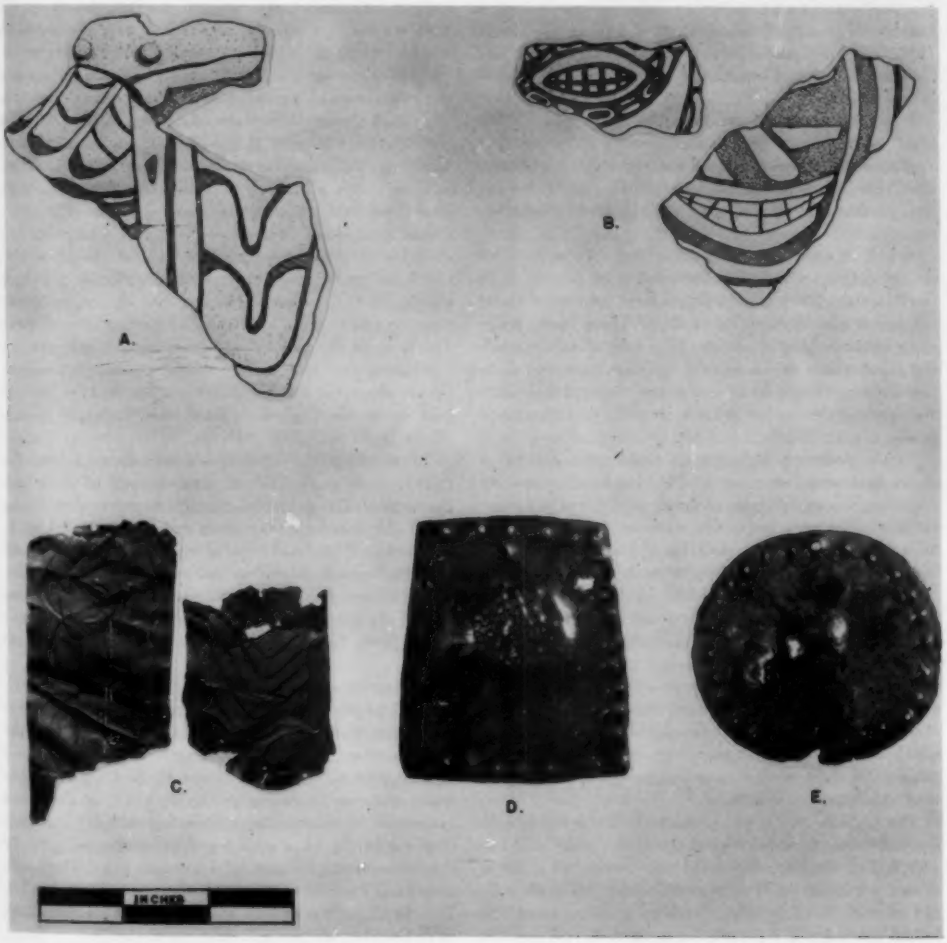

FIG. 2 [Larson]. Ceremonial objects from central and southern coastal areas of Georgia. *a*, incised sherd with eagle motif, Pine Harbor; *b*, 2 incised sherds with face designs, Pine Harbor; *c*, fragments of embossed sheet copper eagle warrior plate from mound at Fairview (Mus. Am. Ind., 17/2968); *d*, *e*, embossed copper ornaments from mound at Woodbine (Mus. Am. Ind., 17/2970, 17/2969). All to same scale.

do bespeak a ritual activity of a complicated sort at the site. Mortuary temples and platform mounds are a widespread trait on the Mississippian time level and would appear to be intimately related with the rich assemblage of ceremonial paraphernalia that is found at this period.

The conch shell bowls from the site are not engraved and therefore can be considered as being somewhat less than specific Cult items.

With respect to the Cult, the Irene site can be characterized as lacking almost all of its distinctive elements. Those which the site does possess are of the type which are indicative of the Cult after it has reached its artistic peak.

Central Coast. The central coastal area during the late prehistoric period is known archaeologically from a number of mounds excavated by Clarence B. Moore (1897: 15-138), and more recent excavations by the Georgia Historical Commission at the Pine Harbor and Norman sites.

Historically the central coast was occupied by the Muskogean-speaking Guale until about 1690 when they abandoned the area or merged with other groups (Swanton 1922: 81). In all certainty the Guale were in possession of this part of the coast during the Mississippian period.

When compared to other areas of the coast, we find centering in an area immediately north of the mouth of the Altamaha River, a surprisingly large amount of material which can be classified as Cult. There seems to be some evidence that this material can be chronologically and typologically separated into 2 phases; however, additional data and additional analysis of the availabale data are necessary before any definite statements can be made in this regard.

At the present time the late Mississippian period on the central coast is termed the Pine Harbor complex. In some respects the ceramic complex in this area is similar to Irene. The most important wares include Irene Filfot Stamped, Irene Incised, and Irene Plain. In addition there is a distinctive and important type, McIntosh Incised, which distinguishes the Pine Harbor complex from what is found at Irene. The type Savannah Check Stamped is important in the Pine Harbor complex during the earlier phase of the period.

The Cult items found on the central coast include ceremonial celts of stone and copper, conch shell gorgets, clay pipes with Cult motifs, clay figurines, engraved conch shell bowls, and pottery vessels with incised Cult motifs. No definite platform mounds have been reported from this area of the coast.

The Cult motifs from the area include the forked eye, the sun symbol, the rattlesnake, and the eagle warrior. The forked eye occurs only as an element of a larger design, appearing on both the rattlesnake and eagle warrior motifs. A fairly large number of variations of the forked eye motif are present on both shell and pottery. The sun symbol appears rather crudely on a number of conch shell gorgets (Moore 1897, Fig. 18). The rattlesnake motif appears on shell gorgets and is the typical coiled design which occurs quite commonly over much of the Southeast (Moore 1897, Fig. 19). What may be a serpent motif is also found on 2 McIntosh Incised vessels which Moore recovered from the Walker Mound (1897, Pls. 1, 16; Holmes 1903, Pls. 119, 120), but the extreme conventionalization of the design prevents a positive identification.

The eagle or eagle warrior motif is the most popular of the Cult elements found in the central coastal area. It occurs on clay figurines, pottery vessels, dipper-like objects of pottery, and on clay pipes. The figurines represent eagle warriors with details of costume incised on the clay (Larson 1955, Figs. 1, 2, 3). Figurines, themselves, are rare in the Southeast during the Mississippian period and representations of the eagle warrior would seem to be unique. A small fragmentary dipper of clay from the Pine Harbor site has the same decorative elements on the handle as the figurines. A number of McIntosh Incised sherds from the Pine Harbor site also have parts of the eagle motif incised on them. One sherd in particular (Fig. 2 *a*) shows the feathers of a wing and a portion of the downy underparts of the body. Eagle warrior representations on pipes are not as definite. A human head is shown with a beaklike nose, a conventionalized modeled crest at the back of the head, and usually with a forked eye (Moore 1897, Figs. 10, 38, 46). The lower half of the beak is never represented and the mouth is indicated, so perhaps an eagle is not really intended. It should be pointed out, however, that the copper plates with representations of the eagle warrior from Etowah also have an elongated nose which undoubtedly portrays a beak, yet the lower half of the beak is missing and the human mouth is shown (Thomas 1894, Pl. 17). Perhaps here we are dealing with a mask over the upper portion of the face.

Numerous conch shell bowls are reported from the central coast, but with one exception all of them lack decoration. The decorated example is reported by Moore (1897: 36) from the mound on the north end of Creighton Island. This bowl "had a length of 12.5 inches and bore an incised decoration unfortunately almost imperceptible, on a portion of the back." Because of the scarcity of engraved shell bowls (almost all known examples come from Spiro), this particular specimen is worth noting.

A number of long stone celts or chisels were also recovered by Moore from the mound on the north end of Creighton Island (1897: 33, Fig. 16). One in particular is interesting because of its length. This specimen is 12.6 inches in length, 0.7 inches thick, 1.1 to 2 inches wide, and has no flaring at the bit. It is of slate, and because if its narrow dimensions and thin cross section, it could hardly have served any utilitarian purpose. In the same mound Moore found a copper celt 7.9 inches in length, 0.27 inches thick, with a flaring bit 2 inches wide. This implement is similar to many which are associated with Cult burials in the Southeastern area.

The ceremonial pottery, McIntosh Incised, is especially interesting because of the motifs and decorative technique used. As has been mentioned above, the eagle and probably the serpent were used; in addition there

seems to have been a wide variety of other designs employed. Some of these involve the human face in a frontal view; 2 sherds with a mouth and the teeth showing have been found on the Pine Harbor site (Fig. 2 *b*). Waring (personal communication) reports a sherd found near the Pine Harbor site which has a crested bird head, probably the woodpecker, incised on it. Some McIntosh Incised sherds have only a fragment of a naturalistic design; others have geometric designs. The McIntosh Incised ware is distinct from the Irene Incised in that the incising is very narrow, almost cutting, and the incising must have been done after the vessel had been dried but not fired. Often parts of the vessel surface have been scraped away to produce a relief design. A variety of vessel shapes characterize this ware, including a compote-like form.

Southern Coast. This area is for the most part recognized as lying in Camden County, the southernmost of the coastal counties, bordering on Florida. Little is known about the archaeology of the area outside of 4 burial mounds investigated by C. B. Moore (1897: 10-15), and a short archaeological survey conducted by the Georgia Historical Commission.

We do know that the groups represented by Irene Filfot Stamped pottery on the northern and central coast never occupied the area during the Mississippian period. Instead it is apparent that the Southern Coast was a part of the northern St. Johns ceramic area as represented by St. Johns Check Stamped and St. Johns Plain pottery during the St. Johns II period.

Since it is known that the Camden County area was occupied by Timucuan-speaking groups during the 17th Century (Goggin 1952: 28-9), and the presence of the St. Johns pottery types indicates that they lived here during the Mississippian period also, we have an excellent explanation of why the area is culturally distinct from the northern and central coasts.

Cult material is known from 2 sites in the area, both of which were excavated by Moore. It is not known what ceramics were associated with this material, but it must be assumed that they were part of the northern St. Johns complex, both from the nature of the Cult materials themselves and what we know of other sites in the area.

The first of the Cult sites was the low mound at Fairview in Camden County (Moore 1897: 10). Moore found fragments here of a sheet-copper plate in association with a cremation. These fragments are the remains of an embossed eagle warrior plate of the Etowah type. They consist of 2 pieces of sheet copper. Both bear a repoussé design and both are presumably parts of a single larger plate (Fig. 2 *c*). One fragment has a hand, with a beaded band on the wrist, carrying a human head. Surrounding the hand and head are sections of spotted wing feathers. Both of these features permit the identification of the piece as a fragment of an eagle warrior plate. The other fragment has no easily identified portions of the design. These fragments are of special interest because similar copper plates have been found widely scattered over the Southeast.

The mound near Woodbine, also in Camden County and excavated by Moore (1897: 13), contained 2 sheet copper ornaments. One of these ornaments is roughly rectangular, 2.6 inches wide and 3.1 inches long, with a central boss and a series of small marginal bosses which give an effect of beading to the edge of the object (Fig. 2 *d*). The second piece is circular, 2.9 inches in diameter, again with a large central boss and marginal bosses or beading (Fig. 2 *c*). Both of these objects were found with burials.

These 2 copper ornaments are not properly classified as part of the Cult as it was defined by Waring and Holder, but they are recognized by Goggin (1947: 275; 1952: 123) as elements in a late ceremonial complex occuring in south Florida extending up into the northern St. Johns area. This assemblage has definite ties with the Cult, and would appear to be a localized manifestation of it. These particular copper ornaments are very distinctive and their presence in the Camden County mounds points toward a certain relationship between the ceremonial complex of this area and Florida.

Summary and Conclusions. It is obvious, even admitting limited data, that actual differences between the ceremonial patterns of the 3 archaeological areas on the Georgia coast do exist. The northern area with its platform mound at Irene lacks almost everything in the way of paraphernalia and motifs which have meaning in terms of the late Southeastern ceremonial activity. The central coast lacks the platform mound, but the area is relatively rich in the eagle or eagle warrior motif and possesses certain other Cult traits which relate it to the rest of the Southeastern area. The southern coastal expression of the Cult, while limited, is distinctive and shows no relationship to the rest of the Georgia coast.

The entire coastal area was marginal to those areas of rich ceremonial development such as Moundville and Etowah. Throughout the entire pre-Spanish occupation it seems to have remained more or less away from the mainstream of cultural developments taking place elsewhere in the Southeast. This isolation was probably due in large measure to the coastal environment.

The northern coast in all probability communicated with the inland areas via the Savannah River and hence would have derived many of its Mississippian cultural traits from the Carolinas and northeastern Georgia. That this is more than a probability is borne out by a comparison of the Irene material and material from the Piedmont area of South Carolina (Caldwell 1952: 320). On the other hand, the central coast was connected to the interior of Georgia by the Altamaha River system which includes the Ocmulgee and Oconee rivers. Thus contact would have been with central Georgia, an area where a relatively elaborate Mississippian development took place. This would perhaps explain, in part at least, the more elaborate Cult expression on the central coast. The southern coastal Cult development is more easily traceable. Clearly its roots are to be found in Florida, and only indirectly is there a Cult relationship to other Southeastern areas. Whatever the reason, whether it was because of language or other cultural barriers, or because

of geographic barriers, there was little or no coastwise cultural exchange on a ceremonial level anywhere on the Georgia coast during the Mississippian period. The distinctiveness of the ritual patterns, as we interpret the archaeological evidence, argues against such contact.

Waring and Holder (1945: 30) suggest that the Cult is in some manner associated with agriculture: "The sites at which the [cult] complex is strongest lie in rich, fertile bottom lands. The distribution . . . coincides with the distribution of the most markedly horticultural communities."

If Waring and Holder are correct in their correlation of the Cult with agriculture, we may have a possible explanation of the way in which the Cult is expressed in certain peripheral areas. The coastal area was not an agricultural area until it was brought under the influence of the Spanish missions. There was a small amount of maize grown during pre-Spanish times, to be sure, but farming achieved nowhere on the coast the magnitude that was to be found along the major river systems of the Southeast. The late prehistoric coastal sites are, without exception, marked by numerous piles of shell. Some of these shell midden sites are quite extensive and stretch for a mile or more along various tidal creeks and rivers. It is fairly certain that the coastal peoples depended to a great extent upon a marine economy. Agriculture, at best, could only have been of minor importance.

Because the Cult seems to have had a very deep influence on the cultures of the Southeast, it must have pervaded many aspects of the culture which were not directly concerned with maize fertility. We know that among other groups a strong religious complex tends to affect all or most phases of the culture. There is no reason to suppose that it could not have happened in the Southeast. In a peripheral area, such as coastal Georgia, where agriculture was relatively unimportant one would not expect to encounter an agricultural fertility cult. One the other hand if the diffusing religious complex is a fairly vigorous one, such as the Cult seems to have been, and one which could exert influence on the nonagricultural elements in the culture, one might well expect to see the adoption of certain of those aspects which were nonagricultural in nature. It is suspected that this is what took place on the Georgia coast and may explain in part the marginal manifestation of the Cult in this area.

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February, 1957

THREE DRY-LAID MASONRY STRUCTURES IN THE NORTHERN ROCKY MOUNTAINS*

In July, 1956, I was requested by Harry B. Robinson, Chief Park Naturalist of Glacier National Park, to investigate 3 archaeological features reported to have been discovered in road construction through Marias Pass, along the southern boundary of Glacier Park. Boyd B. Gordon, Resident Engineer of the Bureau of Public Roads, in charge of the project, took me to the features in northwestern Montana, approximately 12 airline miles west of the Continental Divide, on Marias Pass between the Lewis Front Range and the Flathead Range. The site is situated on 2 flat benches high above the deep gorge of Crystal Creek and the floor of the Flathead River valley, about ¼ mile east of the juncture of the creek with the Middle Fork of the Flathead; its elevation is approximately 3600 feet, but it is surrounded by higher peaks such as Nyack Mountain, 4 miles southwest, which reaches 7760 feet.

* Published by permission of the Secretary of the Interior.

The features consisted of 3 small hemispherical structures of dry-laid masonry. Structure 1 was built of tabular sandstone slabs laid horizontally in even courses to form a dome (Fig. 1). The profile of the broken wall suggests that the slabs were more carefully aligned for the interior surface, and that earth may have been mounded up on the outside. The slabs were of varied sizes, and in places smaller stones appear to have been used for chinking. The entire structure exhibited the same careful construction; it is possible that the slabs were roughly trimmed for greater uniformity before being laid. The floor was lined with sandstone slabs 1 inch in thickness and 1 foot in length, producing a regular flagged surface. Apparently no mortar of any type had been employed in the construction. The dimensions were: diameter, 4.7 feet at the base (north-south); height, 1.7 feet at the center. Although one side of the wall had been destroyed, the east-west diameter was 3.6 feet to the break, and no doubt had once extended at least an additional foot. The top of this structure was 6 inches below the ground surface, and a large tree, 1.5 feet in diameter, was growing over it, one of the roots causing the dome to sag. The western side of the structure may have been exposed, since it lies on a hill slope. An entry may have been placed in this side, but the activities of the road crew had demolished it. Subsequent to the visit the entire structure was buried under rock debris from the road.

Structure 2 lay about 50 yards east of Structure 1 on the same terrace. This structure had collapsed prior to current road construction, though perhaps from earlier road building — if not from natural causes or a defect in construction. At present the feature appears as a mound of dirt and slab rock debris, 10 feet east-west by 8 feet north-south. A depression in the center of the mound about 3 feet across consists principally of the slab rock debris, presumably the remains of the collapsed structure. A large slab located on the lip of the depression suggests that an entry may have been present in the top, closed by this slab. In effect this structure appears to have been similar to the first.

Structure 3 (Fig. 2) is located on a higher terrace, in an area of dense brush, overlooking Crystal Creek and about ¼ miles west of the first 2 structures. It is in an excellent state of preservation and under no immediate threat of destruction. It is a semisubterranean, roughly hemispherical vault, of dry-laid masonry but significantly different from Structure 1 in construction: the walls of this structure were built of large unshaped blocks of stone, varying in size, heterogeneously laid in uneven horizontal courses, leaving an irregular interior face and a corbelled effect. There was a little chinking with rocks, but no evidence of mortar. Fallen wall material lay on the interior floor. The maximum interior width at the base was 4.4 feet and the maximum height 2.2 feet. An opening faced approximately northeast. The structure,

FIG. 1 [Kehoe]. Close-up view of Structure 1.

FIG. 2 [Kehoe]. Structure 3, looking southwest.

on flat ground rather than on a hill slope, was capped by a large, thick slab.

In spite of the differences noted, the 3 structures appear to have been similar in purpose. They are too small for domiciliary use, and the total lack of evidence of burial, fire, or other occupation of the interiors poses the problem of what this purpose was. While storage seems the most probable use for so small a structure, the extensive labor involved and the masonry skill evidenced would seem to indicate either a necessity for caching valuable material, or construction by people well accustomed to building in stone — perhaps both. Although the masonry skill suggests that the builders may have been white men, for example, trappers wishing to store pelts, the large tree overgrowing Structure 1 indicates the possibility of some antiquity.

Huscher and Huscher (1942: 80) call attention to "circular or subrectangular stone structures, often with dry-laid masonry walls and characteristically built in prominent locations, . . . reported from sites ranging from the Plains across New Mexico and Arizona as far as California. West of the Rocky Mountains they have been reported from the Paradox Valley east of the La Sal Mountains, . . . in northeastern Utah, sometimes standing alone and sometimes in supposed association with Pueblo remains . . . [and] in the Rockies from the San Luis Valley on the south . . . across the Gunnison and Colorado drainages as far north as the headwaters of the White River." The Huschers regard these structures as evidence of Athapaskan migrations from the north. It should be noted that the structures analyzed by the Huschers were large enough to be considered houses, but they do not mention the full size range.

The above reference suggests that these dry-laid masonry structures may be of greater significance than might at first be supposed. This description is presented in the hope that it may revive interest in the subject among those working in the Rockies and adjoining areas, and lead to a clarification of the meaning of this trait in the region.

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RADIOCARBON DATES FROM THE MANAKAWAY SITE, CONNECTICUT

The Manakaway site, situated at the tip of Greenwich Point in Greenwich, Connecticut, is a shell midden about 40 by 120 feet in extent, with a depth of about 20 inches. It was excavated by the author during a 3-month period in the summer of 1956 (Suggs 1956a, 1956b).

This is a single occupation site, no breaks in the physical strata or depth differences in artifact distribution being discernible, and it has been assigned to the Bowmans Brook focus of the East River aspect. Some unusual features make the dating of this site of interest, aside from the fact that until this excavation southwestern Connecticut was archaeologically almost unknown.

First, there is the appearance at the site of Vinette I interior cord-marked sherds *above the midden layer*. Other sherds, from within the midden, display partially obliterated cord marking on the interior surfaces, but are not separable in their distribution from the East River sherds.

An additional factor of special interest is the presence of sherds from a vessel decorated with circular motifs in dentate stamping. These consist of several concentric circles arranged below a horizontal neck band of dentate stamping. Other occurrences of circular motifs have occasioned premature inferences of Hopewellian contact (Lopez 1956: 15).

The radiocarbon dates were determined by the Lamont Geochronological Observatory from 2 carefully selected samples. This dating was financed by a grant from the Society of Sigma Xi, for which grateful acknowledgement is made here. The results are as follows:

L-339A. Charcoal from Hearth 1, beneath the midden in the subsoil. Age: 650 ± 100 years (= A.D. 1307 ± 100).

L-339B. Oyster shells from middle of the midden, at N30 E55. Age: 610 ± 100 years (= A.D. 1347 ± 100).

These dates tie in suitably with other recent dates (Crane 1956) for the related early Owasco of upper New York, allowing a time gap between early Owasco and East River:

M-176, early Owasco from Chenango County, 1050 ± 250 (= A.D. 906 ± 250).

M-177, very early Owasco from Herkimer County, 1000 ± 250 (= A.D. 956 ± 250).

The Manakaway dates show that the conclusion that the site represents a single occupation is fairly well justified, and that its assignment to an early Bowmans Brook time level is not unreasonable.

The occurrence of Vinette I sherds and of sherds with partially obliterated cord marking at this late date confirms Smith's suspicion of the continuation of Vinette I and similar material for a much longer period on the coast than inland (Smith 1950: 181). Recently, McKusick has also voiced a belief in the continuance of Vinette I, in his analysis of ceramic materials from the Nas II site (McKusick 1956: 14). Bullen's work in the Shawsheen Valley (1949: 76-7) showed continuance of cognate wares, and Cross (1957: 176) states definitely that interior cord-marked material continues until the Late Woodland period in New Jersey.

There is needed, therefore, a great deal of reinterpretation in coastal sites where dating has been done on the basis of association with Vinette I sherds. Although these sherds are a valuable time marker for upper New York, their value on the coast is slight.

The circular motif, for pottery decoration, is also shown to be too late for a direct Hopewellian contact. The application of circular or curvilinear design motifs to pottery may be an example of the transfer of decorative elements from nonceramic to ceramic media, since from contact times onward we know that curvilinear designs on skins and bark were common. Occurrences of curvilinear elements are both earlier and later than this — Matinecock Point Stamped (Smith 1950: 196) and Van Cortlandt Stamped (Skinner 1909: 118) — but such decoration is too sparsely represented at the Manakaway site to permit us to infer relationships at the present time.

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GEOLOGICAL CONFIRMATION OF NATIVE TRADITIONS, YAKUTAT, ALASKA

An open file report of the U.S. Geological Survey, "Glacial Features and Surficial Deposits of the Malaspina District, Alaska," by George Plafker and Don J. Miller, 1957, not only indicates some of the periods when the Icy Bay-Yakutat Bay area was open to habitation, but seems to confirm native traditions of great antiquity. I am indebted to Don Miller for bringing this report to my attention. In it is discussed the evidence for the following glacial movements:

1. A recession of the glaciers is inferred after the Wisconsin, but we have no evidence whether human occupation of the region was possible. Following this period, there was an advance of the Malaspina Glacier and of lobes that filled Icy and Yakutat bays, so that there was a continuous front of ice along the sea from the west side of Icy Bay to the east side of Yakutat Bay, although the coastal plain east and west was apparently unglaciated. Radiocarbon dates of wood from the end moraines indicate that the culmination in Icy Bay was in A.D. 756 ± 160 (Meyer Rubin, U.S.G.S., W-374, 1200 ± 160 years as of April, 1956), and that in Yakutat Bay was in A.D. 1127 ± 160 (W-559, 830 ± 160 years as of June, 1957).

2. During the subsequent recession, the ice retreated to positions near to or even in the rear of those of the present glaciers. This retreat began about 1400, to judge from the age of living trees near Yakutat.

3. A second advance of the ice, culminating between 1700 and 1791, apparently filled Icy Bay, but affected only the head of Yakutat Bay.

4. Recession began before 1791 in Yakutat Bay, and about 1904 in Icy Bay.

This information accords with the native tradition, told me in 1952 and 1954, that Icy Bay and Yakutat Bay were once filled to the mouth with ice, but that people lived or hunted on the unglaciated coastal areas east and west. Atna Indians, migrating from the Copper River, encountered Eyak-speaking Indians on the shore west of Icy Bay and the combined party crossed Yakutat Bay on the ice, according to one version. The name "Yakutat" is said to be the Eyak phrase meaning "a lagoon (or bay) is already forming," referring to the open water which was being exposed as the ice retreated. This retreat occurred because the immigrants had thrown a dead dog into a crevasse. This tradition seems to fit the period of about 1400. The site of "Old Town" on Knight Island in Yakutat Bay, excavated in 1952 and 1953 by a field party under Francis A. Riddell, must have been founded somewhat later, but, according to the stories, before trees had yet established themselves on the islands in the bay.

Another native legend refers to a village on the west shore of Icy Bay which was presumably settled during the recession of 1400. It was overwhelmed by an advance of the ice, undoubtedly that which culminated in the middle of the 18th century. The ice came down because some young fellows jestingly invited it to a feast. The glacier eventually began to retreat because the entrails of a dead Tsimshian were buried nearby by companions who were trying to preserve the body for shipment home. This incident occurred beteween 1890 and 1903.

Other native statements about the stages in the retreat of the ice in Yakutat Bay during the late 18th and 19th centuries are in complete accord with geological evidence.

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FURTHER DATA AND A DATE FROM CERRO MANGOTE, PANAMA

In the October, 1956, issue of AMERICAN ANTIQUITY (Vol. 22, No. 2) a report was made on preliminary excavations made in 1955 at Cerro Mangote, a preceramic site in Panama. During the 1956 season 6 additional weeks were spent at this site with financial assistance from the American Academy of Arts and Sciences. Briefly, the results of this more extensive work were as follows:

Approximately 300 cu. m. of material were excavated, an estimated one-third of the total content of the site. A few sherds were recovered on or immediately below the surface in the same general area as those found the previous year. There appears to be no reason to change the initial interpretation that these sherds represent accidental intrusions. The stone, bone, and shell artifact inventory was vastly increased but not drastically altered. A total of some 50 skeletons was recovered in fair to poor condition, though 3 skulls were obtained intact. The skeletons showed considerable variation in burial technique. A few additional bundle burials were encountered, but most burials recovered in 1956 were extended or slightly flexed, and generally occurred in groups of three or more. A small quantity of carbon was recovered from all levels, but the only sample sufficiently large to provide a reliable date came from stratum C at a depth of 130 to 145 cm. below the surface. This material was submitted to E. S. Deevey of the Yale Geochronometric Laboratory and as Sample Y-458d yielded a date of 6810 ± 100 years ago (= 4853 B.C. ± 100).

Typologically the Cerro Mangote material appears to precede immediately the earliest known Panamanian pottery phase, that is, the Monagrillo phase. The Cerro Mangote date thus provides an interesting indication of the time pottery may have entered the area. However, in our present state of knowledge 2 factors must be kept in mind. Groups with pottery and otherwise identical groups without pottery could have existed side by side; thus the date cannot yet serve as an absolute bottom limit for the introduction of pottery. Conversely, and in the present instance probably more pertinent, a basic cultural pattern such as that manifested at Cerro Mangote

could, and doubtless did, endure for centuries; so neither can the date provide an upper limit to the pre-Formative. Nonetheless, the date does give us our first positive clue to the time of the tremendously important pre-Formative to Formative transition in the Central American region.

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"SURFACE PRINTING" AS A MEANS OF RECORDING PETROGLYPHS

In 1956, as part of a larger archaeological salvage project for The Dalles Reservoir sponsored by the National Park Service and under the general direction of Douglas Osborne of the University of Washington, a complete record by prints was made of some 400 petroglyphs along a 15 mile stretch of the Columbia River. The original idea for the method and its application to petroglyph recording belongs to Sari Dienes, who has used it in her own art. With the assistance of the writer, Mrs. Dienes did the actual printing of the designs. The project was successfully completed with the aid of a supplementary grant from the Seattle Art Museum. The marked success of the printing technique provokes this description in the hope that it may be applied elsewhere to a neglected aspect of prehistoric cultures.

Surface printing as a technique in the graphic arts departs from the usual procedure in printing. The method, in brief, entails placing the cloth or paper to be printed over the engraved image and then rolling ink directly on the surface of the material. The print obtained is a positive or direct image, as distinguished from the reverse or mirror image obtained by the usual impress printing procedure. A more refined method of historic use in China was recently applied with good results to Mayan glyphs in Mexico and Guatemala. This, however, requires special rice papers and involved procedures of dampening and molding the paper before the ink can be applied. The new method has a number of advantages, particularly under the field conditions likely to be encountered in recording petroglyphs. The cloth or paper, ink, printer's brayer, palette, and masking tape can be obtained or improvised on short notice. The material used needs no processing outside the cutting to size and placement on the rock. And, depending on the ink, a half hour's drying in the open will be enough to allow the print to be rolled without smudging.

Surface printing has several advantages over recording by photography or drawing alone. The print, as such,

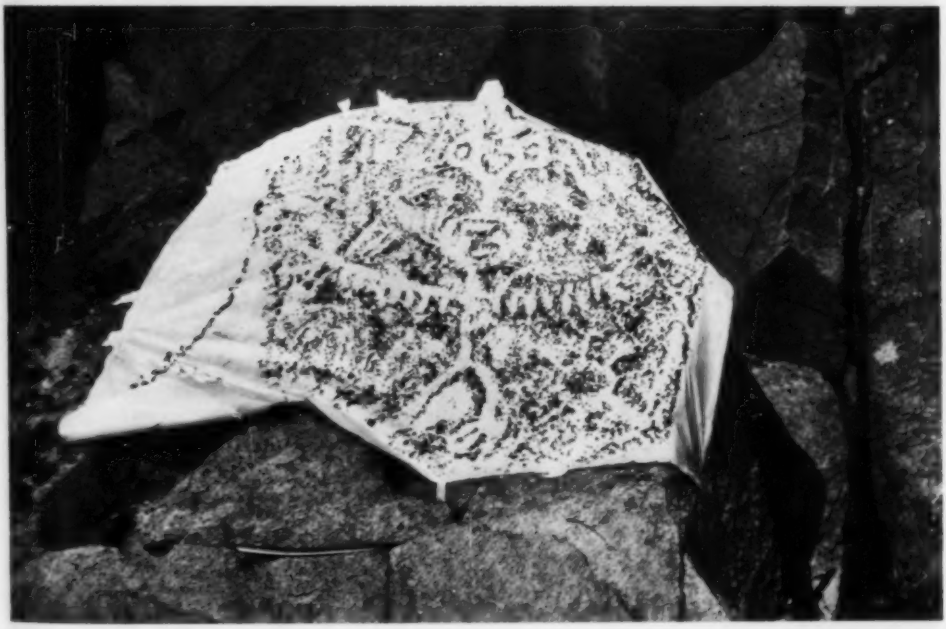

FIG. 1 [Hedden]. Print on Webril of a design from Petroglyph Island in The Dalles Reservoir, showing what may be a shaman or spirit dancer with fringed or feathered arms. Such figures are known along the upper Columbia and in the interior of British Columbia, as well as in Alaskan Eskimo graffiti, but the elaborate headdress of this figure suggests the spirit dancers of early accounts of lower Columbia River tribes.

is an unbiased statement of the markings, natural or man-made, on the original surface. The dimensions of the design are duplicated exactly, without reference to scales. Designs obscured by the most severe weathering can be revealed with a clarity that no recording draftsman would have the temerity to draw. Often, surfaces on which one or 2 designs were suspected will disclose numerous others on the print. Fractures on the surface, which to the casual observer may appear natural, in some instances can be demonstrated to form a coherent part of the design. When the surrounding surface is smooth enough excellent prints can be made of extremely shallow designs. Difficult light conditions and the insidious chalking of petroglyphs by amateurs and picnic archaeologists, which may require hours of scrubbing before unprejudiced photographs can be obtained, are no problem in printing. And finally, the finished print, when done with care, is, in itself, a thing of art, and sometimes more interesting than the original design.

In general, the softest material and the softest brayer works most effectively. The best material used, in terms of cost, sensitivity, and local sources of supply, was a thin muslin. This can be readily obtained in rolls of 100 yards or more from a wholesale upholsterers' supply house. Burlap (at 7½ oz. weight) was found to be surprisingly sensitive for its thickness. In certain field conditions, such as high winds, badly curved or broken surfaces, it is the most usable material. Cheesecloth, while usable when other materials cannot be obtained, is not closely enough woven to offer much surface for the ink. It does give, when the print is placed against a white background, a very delicate and veiled effect. The rice paper used was,

FIG. 2 [Hedden]. Rock surface photographed in direct sunlight, on Petroglyph Island.

unfortunately, a little thick and stiff; however, on flat surfaces, the paper works well. Of 3 grades tried of a nonwoven commercial fabric called Webril, the medium grade was found most successful. This is a lightweight filter cloth manufactured by Kendall Mills and has the advantage of being easily repaired if torn, as will sometimes be necessary in order to tape the material firmly to a surface. Webril can be obtained in rolls of 100 yards or more, 36 to 38 inches wide, at a cost of from $.08 to $.16 a yard, depending on the grade required. Newsprint should not be used. While suitable enough for testing purposes, it is not, by stiffness, a particularly sensitive material. It will rip apart easily in any wind and tends to yellow (oxidize) before long and disintegrate.

Hard rubber brayers are useful in bringing out highlights as well as in being virtually indestructible. The best prints, however, were made with softer brayers of composition or gelatin which spread the ink more evenly, can scoop or push in a little on an uneven surface and are in general more sensitive to detail. The disadvantage in gelatin brayers is their low melting point — just a little above 90° F. In high temperatures and particularly in arid areas shade for the rollers can be difficult to maintain. Wherever possible lightweight brayers with wooden cores should be obtained, as the more common metal cores, under the conditions above, will often absorb enough heat to melt out the inner surface of the gelatin. If the surfaces to be printed are in sunny areas, some kind of box or portable shelter should be arranged for the brayers.

FIG. 3 [Hedden]. Muslin print made on the surface shown in Figure 2; a pair of mountain sheep is revealed in the silhouette style characteristic of the Plateau.

FIG. 4 [Hedden]. Artist Sari Dienes printing a petroglyph on Brown's or Rabbit Island in The Dalles Reservoir area.

Backed with a wooden frame, an ordinary aluminum cookie sheet provides an excellent palette. Care should be taken to keep the palette shaded also, as gelatin rollers will easily absorb heat from its surface.

Oil-based printing inks are most suitable, though virtually any kind of paint, provided it is oil based, can be used. Nondrying black inks used for newspaper printing should be avoided. Use of various colored inks provides excellent contrast and may serve to highlight designs when desired.

Masking tape of 2 inches width is most suitable for fixing the material to the rock. This can be torn in narrower strips when desirable. After printing on paper or loose fabrics, the tape should be stripped off as soon as possible to prevent tearing.

Where surfaces are dusty, sandy, or covered with lichen or other growth, scrubbing and scraping will be necessary. The best tool for this purpose is a wire brush with a scraper attachment.

Proper assistance makes a big difference in the amount of time and effort needed. With petroglyphs located on high outcrops, often accessible only by narrow ledges or scaffolding, an assistant to roll out the ink and hand the brayer to the printer becomes a necessity. With another to prepare new surfaces for printing and set up the material, a fairly workable routine can be set up. Depending on the size and accessibility of the surfaces, the printing may require from 5 to 30 minutes. Cutting and taping of the material may take nearly as long. On the average, with proper assistance, 150 square feet of surface can be printed in a day's work.

While conventional mounting of the sheets on a rigid backing is, perhaps, best, the finished prints may be satisfactorily mounted in scroll form by the use of map mounting cloth, available from an engineering supply house, a hot iron, and a preservative spray.

Techniques of making the print will vary with conditions and surfaces, and experiment is of more value than any but on-the-ground advice. The one technique which the beginner should master before going into the field is that of rolling out the ink on the palette with the brayer so that a thin, even film of ink covers the brayer roller. A few moments spent with a printer in his shop should be a sufficient introduction to the method.

A complete supplementary record of photographs should be kept, in order to compare the original surface with the print, to verify the location, and to determine the relation to surrounding and associated surfaces. In most cases, cracks and fissures of natural origin are easily distinguished from petroglyph patterns on the print. Occasionally an ambiguous case makes reference to a photograph of the original surface desirable. To avoid confu-

sion, prints should be cataloged at the time of printing, and not later. This can be done readily by attaching numbered slips to the printed material with the aid of a small stapling machine.

Petroglyphs are often found in the path of large-scale dam or highway construction. Already hundreds of sites have been destroyed or inundated with only the barest record, if any, of their subjects and style. Occasional efforts have been made to salvage a few samples of a site for placement in local museums — an expensive and highly selective procedure. The number of people with an opportunity to see these not very prepossessing rocks, once removed, is limited. Photographs, even if adequate for purposes of study, are rarely taken with any other consideration in view.

FIG. 5 [Hedden]. A design printed on rice paper, which, like many others on Petroglyph Island, suggests a mythologic bird, possibly Owl. Similar petroglyphs occur on Vancouver Island, Puget Sound, and the lower Columbia, and the design is found on carved stone mortars at Wakemap.

Surface printing, on the other hand, provides a simple, convenient way to record, for study and for exhibit, the literally thousands of petroglyphs scattered throughout the United States. Intensive study of petroglyph designs has been attempted in a number of areas with, however, little being said beyond the concrete statements of what is, and what is not, present in certain limited localities. In the lack of stratigraphic references, an extremely wide space-time perspective is necessary to encompass the subject. Petroglyphs are, in one sense, signposts of the prehistoric movements and relationships of various cultural groups. A thorough-going analysis of petroglyph design traits and their distribution, particularly those of the western states, may provide valuable supplementary data to that realized by the linguist and archaeologist. However, before such work of analysis can safely begin, the many and large areas on which little or no information on petroglyphs is available must be covered, and it is hoped that the method of printing outlined above may serve to stimulate further efforts to this end.

Note: A short discussion of petroglyphs of The Dalles area, and of surface printing, by the present author, appeared in *Craft Horizons* in October, 1957 (Vol. 12, No. 5).

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June, 1957

REVIEWS

Edited by Raymond H. Thompson

Oriental Despotism. A Comparative Study of Total Power. Karl A. Wittfogel. Yale University Press, New Haven, 1957. xix+556 pp. $7.50.

In this outstanding work, the culmination of a lifetime of study, the author combines an exhaustive analysis of a major socio-political type with one of the most important of modern contributions to social science theory. As an anthropologist concerned with problems of social development, the reviewer would like to call attention to a few of the basic ideas presented.

Wittfogel is an evolutionist who, in the Hegelian manner, has rejected both the unilinear evolutionism of the 19th century and the skepticism of the 20th in regard to development. His interpretations revolve about the concept of multilinear evolution; they are based upon the definition of a major type of social development, namely, Oriental society, contrasted primarily with Western society. Wittfogel's method represents a combination of techniques which enables him to analyze types and processes at the same time. He proposes a morphology of development which avoids the hazards of static taxonomies and vague generalizations on the subject of change. Wittfogel's approach can be considered that of a partial, not total, functionalist, as far from those who seek to establish a necessary relationship between all aspects of a given culture as from those who atomize culture by isolating its individual elements. He claims that discernible relationships exist among the chief aspects of every society, but denies that coexistence of the aspects is constant and general. One aspect is or becomes essential and specific by reason of its magnitude and the configuration in which it occurs. This conclusion would lead Wittfogel to a paralyzing cultural relativism, if he did not assert immediately that the number of essential traits is limited, as is the logical number of their combinations. Furthermore, not all possible combinations are found in actual fact, and only a few are significant in the over-all process of development.

As is to be expected, Wittfogel's main effort is directed toward proving that the classical picture of the development of Western society (slave, feudal, capitalistic societies) cannot be applied to Oriental society, and that the latter has its own type and form of development. Perhaps it would be advisable to start reading *Oriental Despotism* at Chapter Nine, which describes the appearance of the concept of Oriental society among classic economists, the ambivalence of Marx, Engels, and Lenin toward that concept, and its suppression during the era of Stalinist Marxism. Another contribution of *Oriental Despotism* is the development of the principle that not every class pattern and class domination system is based on private ownership of the means of production. In Oriental societies the private property system is insecure or nonexistent, and the ruling class is composed not of proprietors, but of public officials. The machinery of the despotic state, far from being the instrument of a class of proprietors, is in itself the ruling class. This identification makes the Oriental state the most absolute and despotic of all ("a state stronger than all other forces of society"). Thus the sociology of classes and political forces that has been developed on the basis of Western experience is not applicable to Oriental societies.

The theory concerning the connection between irrigation societies and Oriental despotism developed by Wittfogel (who concedes prior discovery to the classic economists, particularly Richard Jones and John Stuart Mill) is adequately known today and has been tested on various occasions. There is no doubt that the author has isolated and meticulously analyzed one factor, irrigation agriculture in all its varieties, which has played and still plays an essential role in the history of mankind. Within the compass of this theory Wittfogel has made a number of extensive contributions to American studies especially with regard to the aboriginal societies of the southwestern United States, central Mexico, the Mayan area, and the central Andes. It is curious to note that in the central Andes, for example, both the early Spanish chroniclers and modern archaeologists have recorded the existence of vast irrigation works. But a meaningful connection had not been established between this phenomenon and the character of the Inca state, with its peculiar social and economic organization. The most recent comparative studies and special analyses of Inca society clearly owe much to the stimulus of Wittfogel as a theorist. The case of central Mexico is even more interesting, for the role of irrigation there had been systematically forgotten. It was under the influence of Wittfogel and Steward that ethnohistorical and archaeological research into the irrigation systems of central Mexico was first begun. As a result of this research, many of the ideas concerning the development of Middle America are undergoing change. Unfortunately, no Maya specialist has yet examined seriously the problem posed by a high-level civilization apparently based on slash-and-burn agriculture (low in general productivity and migratory by nature), applying the theory of irrigation societies.

In his treatment of the pre-Columbian civilizations of the New World the author concentrates upon emphasizing their characteristics as they resemble or differ from those of the irrigation societies of the Old World, and upon placing them typologically in the taxonomic scheme which he has proposed. While this is important, it is not enough, although a study of the American aboriginal societies, in detail and with historical depth, certainly lies outside the plan and the objectives of this book. If one takes as an example the confused case of the Mayas, the limitations imposed by the character of Wittfogel's analysis and by the arrangement of the materials available are readily evident. Nevertheless, he makes a good case with his references to the hydraulic works for supplying drinking water (in the north of the Yucatán Peninsula), and

with certain indications as to irrigation in Chiapas and the highlands of Guatemala and Honduras. However, the reader will probably note the absence of a discussion of the fundamentally differing types of Mayan habitat (the temperate and cold zones of the highlands, with their dry seasons; the tropical rain forest and the dry savannas of the lowlands), with which the different agricultural systems and the climaxes of different phases of Mayan development (Archaic or Formative, Classic, and Postclassic) appear to be related. Furthermore, the existence of irrigation-type agricultural systems in the tropical rain forest (the typical habitat of the classic Mayans) cannot yet be dismissed as a possibility. Anyone who thinks Wittfogel has made more of the Mayan case than can be supported by available data would perhaps be well advised to reconsider the entire question of the Mayan agricultural systems and of our knowledge concerning them. The Mayan region may hold surprises comparable to those of central Mexico insofar as irrigational agriculture is concerned.

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Bones for the Archaeologist. I. W. CORNWALL. Macmillan, New York, 1957. 255 pp., 60 figs. $7.50.

An excellent introductory textbook dealing with those aspects of mammalian osteology that concern the archaeologist, this book was designed primarily for a European audience. Cornwall is with the Department of Environmental Archaeology, Institute of Archaeology, University of London. Although he deals only with those animals which appear in European cultural contexts, this detracts little from the general usefulness of the book. A great number of the genera involved are holarctic in distribution and the discussion of the basic osteological features of the larger taxonomic groups is of universal application.

This book is not intended to be a treatise on comparative anatomy, and therein lies its value to the archaeologist who is more concerned with the immediate problems posed by his excavated bones than he is in tracing each one back to Grandfather Fish. It furnishes the student with a sound introduction to the skeletal material he will inevitably encounter in the course of his work, how to handle it, what information, both of a cultural and an ecological nature, is to be derived from it, as well as what can, and, equally important, what cannot be identified.

Chapters deal with such topics as the animal kingdom, the vertebrate and mammalian skeleton as a whole, the skull, dentition, the axial skeleton, fore limbs, hind limbs, determination of species from bones, fragmentary bones, bones in the field and in the laboratory, estimation of age, sex, and stature from bones, and study and interpretation. The text is pleasantly as well as authoritatively written. A collection of 60 line drawings, happily provided with graphic scales, adequately illustrates the text.

This book very nicely fulfills its purpose — that of introducing the archaeologist to his bones. Its direct application on this side of the Atlantic is somewhat limited, however, due to the emphasis placed upon Old World mammals and the exclusion of New World forms.

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Glacial and Pleistocene Geology. RICHARD FOSTER FLINT. Wiley, New York, 1957. xiii + 553 pp., 133 figs., 5 pls., 51 tables. $12.50.

This comprehensive textbook treats of glaciers: their origin, movements, nourishment, wastage, areal and altitudinal distribution, erosion, and transportation work. It discusses glacial deposits, glacial drainage, eolian features, frozen-ground phenomena, weathering and soils, climatically induced stream erosion and deposition, pluvial lakes, changes in level of land and sea, general Pleistocene (Quaternary) stratigraphy, chronology, regional stratigraphy, mammalian fauna, and causes of climatic change.

The book differs from Flint's *Glacial Geology and the Pleistocene Epoch* of 1947 by containing additional chapters or fuller treatments of frozen-ground phenomena, weathering and soils, radioactive isotope dating, stratigraphy of deep-sea floors, mammalian faunas, and so on. It also differs by reduction of other sections, for the 2 texts are about equally long.

After discussing the classification and terminology of the post-Pliocene, Flint suggests (p. 284) that: "(1) Terriary period and Quaternary period be dropped from stratigraphic nomenclature, (2) the Pleistocene series be defined (following Lyell) as including all post-Pliocene strata, (3) the Pliocene-Pleistocene boundary be drawn on a basis of fossils, with consequent climatic implication, (4) the terms recent and postglacial be used informally and applied only within geographically restricted areas."

The chronology chapter describes methods of time estimates from the rate of geological processes (for example, retreat of water falls); dating based on rhythmic natural processes (treerings, varves); measurements of radioactive isotopes (radiocarbon); and dating from geometric variation in the elements of the earth's orbit.

Flint stresses the importance of the radiocarbon chronology and, for the last glaciation and the Neothermal, employs it almost exclusively. Though he grants that the C^{14} method of dating is subject to errors, he does not evaluate any dates or discuss contradictions or unreasonable implications of dates. Since furthermore he does not list papers attempting a critical appraisal and discussion, it is in order to refer to such articles in the *Journal of Geology* of 1953-55 and 1957 and to restate

some of the several implications of the North American radiocarbon chronology and of its correlation with Europe.

The radiocarbon age of about 11,200 years for the Two Creeks forest bed 90 miles north of Milwaukee and the inferred C^{14} age of some 10,700 years of the later Valders glacial maximum at Milwaukee correlate them (p. 395) respectively with the relatively warm Alleröd and the cold Younger Dryas (the Salpausselkä age, the Fenno-scandian moraines), ages dated by varves, pollen, and radiocarbon. While the Two Creeks forest was killed during a cold ice readvance, the age of the preceding ice retreat was comparatively warm. Therefore the subsequent advance to the Valders maximum indicates a temperature lowering just as does the Younger Dryas flora. But the agreement of the correlation of events subsequent to the Two Creeks age seems to end there. Where then are the Scandinavian equivalents of the Canadian ice border oscillations at Barrie, Pembroke, and Cochrane? As C^{14} dates are interpreted by Flint and others, the North American ice border stood near Cochrane, 575 miles from the Labrador ice center, some 7000 years ago. But by 7000 B.P. the Scandinavian ice sheet had disappeared and the temperature approached its Neothermal maximum, so this transatlantic correlation confronts unlike climatic conditions.

Because the modern temperature changes are similar and synchronous in North American and in Europe, I have concluded that the past major temperature variations also were parallel; and as a consequence I have correlated the ice oscillation at Cochrane with those recorded south of Stockholm and north of Helsinki, that is, with the Salpausselkä age. I have furthermore applied the Finno-Swedish varve date of the Salpausselkä to the Cochrane, and have on varve measurements and estimates built up a chronology of the pre-Cochrane ice retreat. I have in this manner dated the Valders glacial maximum at Milwaukee at roughly 18,500 years.

Therefore, we are facing a dilemma. Either the temperature histories of North America and Europe since the Valders maximum were largely different, and the North American C^{14} chronology of the Deglacial is correct, while my correlation and chronology are wrong; or the past temperature variations of the 2 continents were essentially parallel, and my correlation of the Cochrane with the Salpausselkä as well as my chronology are correct or reasonable, while the North American radiocarbon chronology is wrong. Since Flint (p. 494) concludes, as I do, that the past temperature fluctuations have been approximately synchronous in the 2 continents, he too arrives at a negation of the North American C^{14} chronology, but he gives no indication that he comprehends this fact.

This history of the climate is treated in various appropriate connections. The term "Hypsithermal" is used as a substitute for Altithermal, Climatic Optimum, Thermal Maximum, and the misused Megathermal, which properly applies to the region with a winterless climate. However, Flint's definition (pp. 377, 396) of the Hypsithermal is apparently now abandoned, for Deevey and Flint (1957, *Science*, Vol. 125, No. 3240, p. 183) redefine the term to comprise the Danish pollen zones IV-VIII, that is approximately the time 7000-600 B.C. In contrast, the Altithermal is the distinctly warmer age of about 5500-2000 B.C., which in the West was also very dry—the Long Drought. Since the change from arid to semi-arid in large parts of the West about 2000 B.C. was geologically and biologically very effective, it is a natural and important boundary. In the West "Hypsithermal" is unsuitable and is no appropriate substitute for "Altithermal."

The problem of causes of climatic change is given a separate and instructive chapter which presents miscellaneous data on contemporary change (such as instrumental records and deglaciation) and of past changes (such as glacier fluctuations and pollen stratigraphy). It also discusses amplitude of temperature fluctuations, quantity of precipitation, periodicity, relation of glaciers to highlands, and so on. One of the several conclusions reads (p. 494): "Fluctuations within the last 30,000 yr seems to have been approximately synchronous in western and eastern North America and in Europe. Fluctuations within the last 10,000 yr appear to have occurred in phase in the polar hemispheres."

Because the subjects dealt with in the book cover a much wider field than any one person can master, the quality of the treatment naturally varies with Flint's degree of knowledge of the problems. This fact and a confident, and at times slanted, style result in incorrect or misleading statements. Since several negating implications of the North American radiocarbon chronology have been discussed in critical papers, Flint's failure even to mention them is an avoidance of facing facts, problems, and consequences. More than anything this chronology needs a thorough investigation and evaluation, and a separation of the seeds from the chaff. Though a textbook should have a bibliography, this one has instead a list of references, several of which are too subjectively chosen. Nevertheless, the book is beautifully made up, well written, in most respects good to excellent, and certainly useful.

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The American Indian in Graduate Studies. A Bibliography of Theses and Dissertations. Compiled by FREDERICK J. DOCKSTADER. Contributions from the Museum of the American Indian, Heye Foundation, Vol. 15, New York, 1957. xvii + 399 pp. $5.00.

The important contribution that bibliographies can make to research will be apparent to anyone who spends a few minutes with this carefully compiled volume of 3684 titles from 203 colleges and universities, spanning the period from 1890 to 1950. Even the most assiduous scholar will have overlooked some of the titles listed here

and will find them valuable to his investigations; and many who have barely begun to use the wealth of unpublished material available in A. M. and Ph.D. theses will welcome this convenient listing.

The compiler has included every thesis or dissertation that dealt with the Indian "to the extent of at least one chapter" or in numerous scattered passages, and therefore includes every study dealing with New World archaeology that has been presented for the A.M. or Ph.D. in Canada, the United States, or Mexico, as far as he could learn of them.

Of 600 titles chosen at random by the reviewer about 11% dealt with archaeological matters, and about ⅔ of these were unpublished. Main entries are arranged alphabetically by author and elaborately indexed. For example, under "Archeological sites; areas, periods" appear over 200 names, from Ackmen-Lowry to Zacualpa and Zetrouer; for "Dogs" there are 4 references in the index; for "Pottery; ceramics" 64; for "Texas" 162; and for "Wampum" 2. Thus one can fairly easily determine if a thesis has ever been written on any particular topic or area. Aside from the usefulness of this list to the researcher, it can save the prospective degree candidate considerable doubt as to whether the topic being considered is "new" or not.

Although reviewers are traditionally expected to cite at least a few flaws, however small, to demonstrate the care with which the volume has been scrutinized, this is a difficult task in the present instance. The organization, completeness, and accuracy of the entries appear excellent. Not every thesis was actually examined, so a few titles that were not self-expanatory may be inadequately indexed. But in many instances Dockstader has added a brief comment to indicate the interest of the contents for New World anthropology. Theses subsequently published are so indicated, but by now a good many more are in print, with no mention of the fact here.

The compiler's labor and the Heye Foundation's expenses of publication will be fully justified if the substantial resources of unpublished description, analysis, and synthesis in New World Indian studies are hereafter put to more frequent and effective use, by means of this volume.

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The Archaeology of New Jersey, Volume Two, the Abbott Farm. DOROTHY CROSS. Archaeological Society of New Jersey and New Jersey State Museum, Trenton, 1956. xii + 215 pp., 17 figs., 46 pls., 14 plans, 1 graph. $7.00 cloth, $8.00 deluxe.

This is basically a site report. It is well written, the drawings and cartography are skilfully done, the photographs of both the excavations and artifacts are clear, and the general organization of the book is excellent. For a clear understanding of the book, I believe it is best to divide my discussion into 3 parts.

The first matter that Cross deals with is the problem of the claims for "Paleolithic" finds from the Abbott Farm and adjacent areas. In Chapter I, she has a good review of the previous work, disputes, and so-called conclusions from the period of 1872 to 1956. From Cross's lucid account of the background for the site, one can see that, as in the case of so many disputes concerning interglacial man in the New World, wishful thinking, opinions, and passions have far outweighed the artifacts, facts, and objective analyses. In the chapter on geology as well as in the Summary and Conclusions, Cross gives what I think is a fairly final statement concerning the so-called "argillite cultures," the Paleolithic implements, and the interglacial artifacts in the New World as represented in the Trenton gravels. Briefly, her conclusions are the following:

1. There is no evidence of a Paleolithic culture at the site nor did she find any artifacts in the Trenton gravels.

2. The yellow sands overlying the Trenton gravels in which the so-called "argillite culture" occurred were not waterlaid and are not of interglacial time. The yellow sands, in fact, seem to be relatively recent.

3. There is no evidence of an "argillite culture" per se because argillite tools were made right up to historic times in this area and do not form a cultural complex of a distinctive time period.

The second part of my discussion concerns the description of the materials she found at the archaeological site. As an introduction to this, there are brief chapters on the excavations and stratigraphy. The site is divisible into 2 parts: the Lowlands, and the Bluffs. The Lowlands have rather excellent stratigraphy with 4 superimposed humus levels containing evidence of human occupation, which are separated by relatively sterile sands. The Bluff consists of archaeological materials found in varying depths in yellow sands above the gravels. Some of these artifacts are scattered haphazardly through the sands, while others represent more definite occupations or components as they occur in pits, hearths, caches, burials, and other features.

Next, the pits, hearths, burials, and caches are described with lists of associated artifacts. One thing that is particularly troublesome about this section is that little or no cultural assignment either in terms of time periods or in terms of focus or phase is given these archaeological features. Certainly each one represents a component of a cultural entity. Though the contents of the pits, hearths, burials, and caches are described, it is unfortunate that some of the abbreviations and pit listings cloud the cultural affiliations of each pit rather than clarify them. For example, in the abbreviations used for materials in the pits, the pottery types Thick Interior Cordmarked and Thin Interior Cordmarked, which appear to have very different temporal positions in stratigraphic levels of the site, are lumped together and called ICM, meaning Interior Cordmarked. There are other examples of this sort of treatment.

The greater bulk of the report is concerned with artifact typology. As far as I am able to determine, the pottery types are set up so that they are time markers and are not based only on differences in form or manufacturing technique. This section on the typology has only one marring feature in it. This is Table 17, where the materials from the one "pure" Early Woodland component from the lowest humus in the Lowlands are left out because Cross thought there were too few sherds to bother to enumerate. This prevents one from understanding exactly what the ceramic complex of her Early Woodland cultural entity is.

The description and typology of the artifacts other than pottery seem to be done in a rather different manner. First of all, it seems that the types of projectile points, scrapers, and other artifacts are not determined wholly, or even partially, by their temporal and spatial significance. In many cases Cross mentions that the so-called subtypes are better time markers than her types. In her charts she gives the distribution of types but, unfortunately, the subtypes are not mentioned. With many of these types, although there is a description of them and pictures in the back of the book, there is no cross-referencing, nor in the descriptions are the dimensions given. The whole report would have been greatly improved if the sort of typology for projectile points that Suhm and Krieger used in their *Handbook of Texas Archeology* had been followed. From the picture one gets of the artifacts other than pottery, there appears to be great continuity in her sequence. Some of this, because of the peculiar way she has done the typology, may be more apparent than real.

My final discussion concerns the Summary and Conclusions. One finds in this section that Cross believes there is a paleo-Indian horizon at Abbott Farm. This is based upon 3 parts of fluted points, not Folsom points, two of which were actually found above pottery. Neither in her section summarizing the cultural context nor her cultural reconstructions is there any definite proof of paleo-Indians having lived here; there certainly is nothing than can be considered a paleo-Indian component. She believes that the next horizon belongs to the Archaic period but again, in her excavations, she records no actual horizon or pit that has Archaic materials as such. Not being able to define an Archaic component, she bases her Archaic horizon on the occurrence at the Abbott Farm of artifact types found in other Archaic horizons in the east, though she readily admits that Archaic types seem to persist somewhat longer in the ceramic horizons in New Jersey than elsewhere. Her presentation of the evidence for an Archaic occupation is extremely poor. I do believe, however, that a reanalysis of some of the materials from her pits might indicate that certain of them do belong to one or more Archaic components. For example, Pits 23, 27, 55, and 77 from Excavation 2, Pits 5, 6, 7, and 11 from Excavation 3, and Pits 4, 22, 23, and 32 from Excavation 9, as well as a number of the caches, are without ceramics, and some of them certainly have artifacts which are similar to those found in Archaic horizons elsewhere. Perhaps these are actually components of the Archaic at Abbott Farm. If so, the matter is not demonstrated in Cross's conclusions.

Humus 4, from the Lowlands, Pits 22 and 85 from Excavation 2, Pit 18 from Excavation 3, and Pits 11 and 12 from Excavation 9, have specific pottery types and artifacts that could be classified as Early Woodland. To define this period these materials are combined with others out of stratigraphic context but considered Early Woodland on the basis of comparisons with other areas in the eastern United States. I think it would be clearer if she treated these 2 kinds of evidence separately.

The Middle Woodland definition is better, as it is based on materials from Humus 3 from the Lowlands and from pits or levels from the Bluffs above which contain similar materials. The definition of the Late Woodland horizon, based mainly on those materials found in Layer 2 from the Lowlands, also seems reasonable.

All in all, despite what I consider to be flaws in analysis and interpretation, we should be thankful for having this site report from New Jersey, for which we have so few archaeological treatises.

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Understanding Iroquois Pottery in Ontario. J. NORMAN EMERSON. Ontario Archaeological Society, Toronto, 1956. vi + 64 pp., 23 figs., 9 charts.

This report is an example of the excellent cooperation which exists in Ontario between professional and nonprofessional workers in archaeology. Its specific purpose is to serve as a "guide to pottery analysis" and an introduction to the problems and methods of pottery classification for those who lack training and experience in handling Ontario Iroquois pottery. The explanation of how to proceed with pottery analysis is divided into 3 major sections: how to describe the material, how to record the observations, and how to make the data meaningful.

The first section defines terms commonly used in pottery description in the Northeast. These are clearly presented and adequately illustrated. The analysis begins with sorting pottery rim sherds into form classes of rim profiles, followed by a further breakdown by technique of decoration and design motifs. Those categories which have been found useful in previous pottery analysis in the area are described for each of these steps. Some difficulty may be encountered here, especially in the use of the classes of rim profiles, because the categories are not mutually exclusive and no boundaries are described for certain attributes which are poles of a continuum. Greater uniformity of classification would result from more precise definition of the classes of rim profiles.

The data are recorded in a manner which will provide information on the combinations of the rim form

and decoration classes. These combinations have been found useful for defining pottery types in Ontario since certain forms occur in association with certain designs. The combinations which mark the presently defined Ontario pottery types are given in the Appendix in an abbreviated manner to serve as a ready reference. These pottery types are expected to classify the majority of rim sherds from any Ontario Iroquois site.

The foremost consideration in making the data meaningful is the relation of the site to other sites in the Ontario sequence so that its chronological position can be determined. This procedure is illustrated by 3 examples, each of which deals with the temporal arrangement of 11 Ontario Iroquois sites. Since this is the first time this sequence has been published in full, the results deserve careful inspection. It should be made clear that, in view of the purpose of this volume, no attempt has been made to present all the evidence on which the sequence is based.

The first method is that of Brainerd and Robinson (1951, Am. Antiq., Vol. 16, No. 4, pp. 293-313) for the ordering of sites by coefficients of agreement. Emerson does not accept the best arrangement of the agreement coefficients as one from which the chronological position of all the sites can be inferred. He compares this arrangement with 2 others. The first is an arrangement of the same sites by "cross dating" sherds found on Ontario sites which represent pottery types from other areas where they have a restricted distribution in time. The second is a geographical arrangement from west to east and then north. From these 3 arrangements, each of which differs in the position of at least 2 sites, he presents a "combined sequence" which he regards as the chronological order. One is left with the impression that the chronological sequence is, after all, a matter of intuitive judgment.

For the student who follows one of these 3 methods in trying to relate his site to the sequence, this part of the procedure would be most difficult to follow. If Emerson rejects the best arrangement of coefficients of agreement as being the "real historical order," he must explain more convincingly the differences between the best arrangement and what he considers to be the historical arrangement. Statements of the amount of departure from the ideal arrangement as suggested by Robinson for both the best arrangement of sites by coefficients and the historical arrangement of the sites by coefficients might indicate whether there is a clear-cut choice between the two.

If a convincing arrangement of the sites following the Brainerd-Robinson method can be found, there seems little reason to reject this as the chronological order on the basis of the evidence which yields the other 2 arrangements. The usefulness of "cross dating" to arrive at a sequence depends on a thorough understanding of the distribution of "aberrant" types, here mainly in New York State. This information is lacking at present. A geographical ordering of sites may explain cultural similarities and differences on the same time level, but since it is a spatial arrangement cannot yield inferences of chronological order. Emerson does not present either the sequence or the pottery types with any emphasis on finality. Instead he encourages the student to understand the problems, many of which he indicates clearly, and to attempt additional ways of analyzing and ordering the data.

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Archeological Survey of the Big Sandy Reservoir Area, Southwestern Wyoming. E. Mott Davis. Notebook No. 2, Laboratory of Anthropology, University of Nebraska, Lincoln, 1956. xiv + 113 pp., 4 figs., 10 plates.

This multilith publication reports the results of an interagency cooperative archaeological salvage program, carried out primarily by the Smithsonian Institution, the National Park Service and the Bureau of Reclamation, Department of Interior, and the University of Nebraska State Museum. This paper reports the findings of a preliminary survey of the Big Sandy Reservoir by George Metcalf and Lee Madison for the River Basin Surveys of the Smithsonian Institution, and a subsequent 3-week intensive survey with salvage excavation by Davis and 3 field assistants for the University of Nebraska. Prior to Davis' arrival, part of the sites had been destroyed by flooding and by now, presumably all of the sites reported have been destroyed. The paucity of information from southwestern Wyoming gives significance to this report. E. B. Renaud of the University of Denver conducted archaeological reconnaissance in the general area in the 1930's and the University of Pennsylvania Museum and the University of Nebraska State Museum investigated the nearby Finley or Eden Valley site in the 1940's. The small amount of work in the area is deplorable in view of the increasing interest in Great Basin-Plains relationships.

The Big Sandy Reservoir is situated just beyond portant role in the historical movements of pioneers west and presumably served as a communication route between the Great Basin and Plains in prehistoric times. Davis' motley assemblage of artifacts reflects influence from both of these areas, although identifiable diagnostic artifacts are very few, and are restricted to stone specimens. No pottery was found and the only structural evidence consisted of fire basins. For the most part the material found was from the surface, and the entire reservoir area was nearly devoid of deposits which could have buried cultural levels.

On the basis of the artifact assemblages, Davis postulates 2 principal types of activities at the sites: the making of tools from the abundant cobblestones, and everyday camping activities such as food-getting, cooking, and the processing of hides. He also concluded that occupation at the sites was brief, although one site at least, had been repeatedly occupied from perhaps 2000 B.C. to late

prehistoric times. Points, 35 of which were found, are considered to be the most diagnostic artifacts recovered. Duncan, Hanna, and McKean types occur, as well as small trianguloid and notched points. End- and side-scrapers (10 were found) suggest Plains affiliations, while grinding slabs (4) and mullers (11) suggest Great Basin affiliations. The most numerous artifacts, however, are modified fragments (278), flake scrapers and flake knives (71), choppers (122), and knives (105).

Considering the apparently careful work by Davis, and our ignorance of the area, it is regrettable that so little material was encountered in this reservoir area. On the other hand, it is heartening that so little archaeological material was destroyed. Would-be investigators in this portion of the Green River drainage of southwestern Wyoming should be encouraged by the fact that Davis mentions other sites that appear to be far more significant than those that were to be flooded.

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The Mortlach Site in the Besant Valley of Central Saskatchewan. BOYD WETTLAUFER. Soils report by Harold C. Moss. Anthropological Series No. 1, Department of Natural Resources, Regina, 1955. 113 pp., frontis. and 11 figs., 14 pls., 11 illus.

Wettlaufer's report on the Mortlach site, south central Saskatchewan, is an excellent contribution to Plains archaeology. The facts are clearly stated and the illustrations are good. Moreover, Wettlaufer analyzes his data in terms of similar findings already reported to the south, particularly in North Dakota.

The Mortlach site presents no surprises for Plains archaeologists. The sequence of horizons, which Wettlaufer refers to as "cultures," has already been suggested by work along the Missouri River. This report further refines the sequence and adds information on its extension northward.

Site maps and soil prc files are excellent. One, Figure 6, is multicolored for clarity. For those not familiar with Saskatchewan, however, it is necessary to consult an atlas for the location of Mortlach.

Part I describes the excavations and provides details of the material found. In Part II Moss analyzes soils in the vicinity of the site and gives a general description of the area. Part III is a summary and conclusion. Considerable attention is given to climatic changes evidenced in the soil levels, and these are discussed in terms familiar to most North American archaeologists.

The Mortlach site proved to be stratified and the following horizons were recognized, extending over approximately 3000 years:

Thunder Creek. This is represented by the oldest remains at the site. Implements are very similar to those identified in the United States as "Duncan and Hanna points" or "stemmed, indented base points." These are often placed in a major era of the Plains known as "The Foragers." Radiocarbon dates it in Canada at 3400 ± 200 B.P. Ovoid knives, "pebble scrapers," "flat end scrapers," and choppers or cores are also described for this complex.

Pelican Lake. Points are corner-notched, but the notches are wider than those of later specimens.

Sandy Creek. "A whole new bone complex made its appearance at this level." Included are an awl or needle and a large tanning implement. Points are fairly distinctive, with wide, shallow side-notches and concave bases.

Besant. This level consists of 4 occupations. In the uppermost, postholes suggest a circular structure, possibly a dwelling but without a center hearth. Points are like those of the Sandy Creek level. Besides scrapers and choppers, a drill and a bone pendant occur.

Caron. This level is not "too well represented," but is distinguished by eared projectile points of "Knife River flint," presumably from North Dakota. Such points have shallow side-notches and straight bases.

Moose Jaw. Pottery occurs for the first time, cord marked, grit tempered, round bottomed, and shouldered. Side-notched points predominate and there are several varieties of scrapers. Pipe fragments suggest a tubular or elbow type. A blue bead and a metal scraper show European contacts, possibly during the late 1700's.

Mortlach. The last horizon has check-stamped pottery. Vessels apparently were squat and round bottomed, with shoulders and incurving rim, thus, according to Wettlaufer, resembling wares found in Montana at the Hagen site. Points are side notched.

Personally, I find Wettlaufer's report very valuable and I shall refer to it time and again in my studies in the northwestern Plains region. The Saskatchewan Department of Natural Resources is to be congratulated on the quality of this publication, the first of a series with great promise.

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Prehistoric Stone Sculpture of the Fraser River and Gulf of Georgia. WILSON DUFF. Anthropology in British Columbia, No. 5, British Columbia Provincial Museum, Victoria, 1956. Pp. 15-151, 8 figs., 24 pls., 15 maps, 5 tables.

No one would deny the primary place held by Northwest Coast art in the worldwide field of primitive art. No anthropologist who knows the Northwest would deny that studies of archaeological and ethnographic carvings offer us one of the most fruitful approaches to problems of local culture history. The difficulties of such investigations loom large; chief among them is the lack of able and dedicated personnel. Fortunately Duff combines these qualities; the result has been a valuable contribution to Northwest anthropology.

The report is divided into 2 parts. The first is descriptive. My quick count indicates that Duff has located and examined more than 260 items of stone sculpture. In Part 1 an adequate classification is offered. The many types of stone bowls, mortars, charms, labrets, pipes, carved mauls, and stone figures are discussed, for the greater share individually — some merit a few lines, other pieces a half page or more. A lengthy trait list, arranged analytically and geographically, clearly presents the various descriptive data on the seated human figure bowls which form the largest and probably most important class of objects. This is followed by a discussion of distributions, materials, sizes, techniques, spatial and chronological information, stylistic units, ethnographic data, and so on. The other classess of stone sculpture receive a similar but generally abbreviated treatment.

The lower Fraser area is apparently the center of development and elaboration of these items. The nearby Gulf Islands region is secondary; here more sandstone was used; soapstone may not have been as available. The Upper Fraser area is the source of the soapstone for the carvings and the nephrite and serpentine for the adz blades used. This area appears not to have shared in the early development but to have taken over some of the forms and elaborated them later. There are 5 other areas of local development.

The age of the major periods of carving is unknown. The best association is with the Marpole (Eburne) site which appears to span the period from 2000 to 1000 years ago. Most of the earlier carvings would fall into this period; more developed ones may be later. The seated human figure bowls are known to have been used ritually by the recent coast Salish. It is not known whether these uses are remnants of old functions or not. It might be suggested, parenthetically, that they could be secondary.

Duff points out that the present Coast and Interior Salish dividing line cuts through the stone carving area. He believes that this well-known cultural division is more recent than the great period of stone carving and that the Lower Fraser culture and probably Coast Salish language were extended into the Upper River during this period. There has since been a contraction which was probably concomitant with the development of cultural and linguistic differences. I find this interpretation congenial; others might be inclined to stress the possibilities of art styles and associated techniques spreading independently of language and other aspects of culture, but Duff's discussion and reasoning will not be easily overthrown. His datings do not, however, fit with the glottochronological interpretation. Duff has reason to correlate his stone sculpture with both linguistic and economic aspects of Lower Fraser culture. The Fraser and Gulf Islands culture areas contain 60% of the artifacts that he examined.

The broader art style into which these stone carvings fit is definitely Northwest Coastal. There is a strong emphasis on head and facial features and a slighting of the rest of the body. All are zoomorphic; the Northwest Coast eye is in evidence. There are variations which may be regional, temporal, or individual. It is unfortunate that there are no stratigraphic associations.

In his analysis Duff does not find evidence of the late and complex northern style of the Tlingit and Haida, but, instead, finds that the stone carvings are related to the probably older and adjacent southern or Wakashan style. There is a lack of split animal forms, filler designs, and so on. The Salish stone carving is more sculptural, as is the Wakashan. The conclusion is that the stone carvings are much more a part of the Northwest Coast art picture than is later Salish wood carving as we know it. This basic fact would suggest either that the stone work did not develop from Salish wood carving or that the latter borrowed from the southern aspect of the Northwest for their stone work. Such a suggestion, Duff points out, is dubious because there is no known older aspect to the north which could furnish the inspiration. There is a lack of both stone and stone carvings there. Of course, it is possible that the carvers were not Salish, but there is close correspondence in distribution of the carvings and aspects of Salish culture. There may have been small wood carvings, of a style whence the stone carvings could have developed, which differed greatly from modern Salish wood carving, but evidence for this is meager. Other carvings, those of bone and antler and the whalebone clubs, bear some relationship to the stone carvings but the small similarities are not sufficient to settle the question of the presence or absence of a basic style, in media other than stone, from which the stone carvings could have developed. Thus Duff suggests that the style may have developed independently in soapstone. This suggestion is, to me, a difficult one to accept but it is not one that can be controverted now.

The related Columbia River style (there are probably several styles and substyles) is discussed briefly. Duff feels that there is an old and basic relationship, but that there have been long periods of essentially independent development. I agree with this and point out that a general tendency to ascribe interior Columbia cultural development to coastal influences is unfortunate and is not wholly correct, although I do believe that the Fraser interior offered much to the Columbia Valley via the Okanogan and Similkameen valley routes.

In sum, Duff's work has provided an excellent base for further badly needed similar studies. He has shown that art studies in the Northwest can contribute to a broad culture history and has added respectable data to a major problem of the area, that of Interior and Coastal relationships, in showing that the stone sculpture has apparently worked its way upstream.

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An Archaeological Survey of West Central New Mexico and East Central Arizona. EDWARD B. DANSON. Papers of the Peabody Museum of Archaeology and Ethnology, Harvard University, Vol. 44, No. 1, Cambridge, 1957. ix + 133 pp., 18 figs., 23 tables. $4.50.

This report, the first of a series on the results of the Peabody Museum's Upper Gila Project, is a valuable step towards a more complete knowledge of the Mogollon culture and its relationship to the Anasazi culture. It is concerned with the analysis and synthesis of materials from several hundred Mogollon sites and a number of Anasazi sites. The majority of these were located in a crucial transitional zone which extends from the northernmost tributaries of the Upper Gila River north past U.S. Highway 60 some 30 miles, although the survey as a whole also included many sites situated as far south as Silver City, New Mexico — in the Mimbres area.

A wealth of data, particularly on the distribution of pottery types and certain architectural features such as plazas, terraces, kivas, and masonry is contained in a series of tables for each of the 15 stream valley regions into which this vast area is divided. There is a chapter in which the physiography, ecology, and known archaeology of this part of the Southwest surveyed is described in careful detail, and a separate chapter is devoted to each of the major subjects dealt with in the tables, such as pottery, architecture, and stone implements.

However this is more than a simple account of the information gathered. The data stimulated a number of ideas and hypotheses which together form an outline of the broad ebb and flow of major cultures in the area. In accord with current theory, Danson pictures an early, widespread, relatively uniform Mogollon culture as present in the central mountainous area. However, by A.D. 700 there was already a perceptible influx of Anasazi culture from the north. It is not clear whether this was the result of trade or migration. Evidence for this flow of culture is seen in pottery, architecture, and other traits. With the passage of time, this steady tide of culture from the north gave rise to a mixed culture for which the author suggests the term "Alpine Branch." During Pueblo I this branch occupied the drainages which flow northward from the central mountains. However, by Pueblo II the tide of culture had crossed the mountains and by Pueblo III extended as far south as the lower Tularosa and the middle San Francisco river valleys. Finally, during late Pueblo III something happened to initiate a general exodus. The author believes that this was caused by the arrival of "enemy peoples," because so many of the latest sites are planned and defensive in nature and/or are situated on defensible terrain. By the first part of the 14th century the entire area was virtually abandoned with the exception of a very few isolated outliers of the Point of Pines group to the west or the Cibola group to the north.

In addition to providing a tentative outline of cultural movements in the northern Mogollon area, Danson explores the relation of village location and population density to topography. He finds that, "The majority of the early sites were in the upper tributaries and higher elevations. During the later periods the opposite was true and the large late sites were not usually to be found along the upper tributaries." This observation and the data behind it provide interesting material for a larger study of population movements and the relation of living arrangements to environment, and as such it is a welcome change from the former concern with taxonomy and the "Is the Mogollon culture a basic culture, or not?" question.

Perhaps because Peabody Museum conceived this research in an era when this question was a major item of controversy one can detect now and then faint echoes of this debate which mar this otherwise commendable report. One of these "echoes" is a skewing of the early part of the chronology of the area towards lateness, so that one has the feeling that Danson would place the vast majority of "plain ware sites" later than A.D. 500 or contemporary with Basket Maker III. This is evident in the lumping together of actual plain ware sites along with sites that also have neck-banded and painted decorated sherds into a period termed "Pre-Pueblo." Another indication of this sort of distortion is his use of Mogollon Red-on-Brown as a diagnostic trait of a period coeval with Pueblo I rather than Basket Maker III, although he uses White Mound Black-on-White and Alma Neck Banded (which have been found in a number of sites in association with Mogollon Red-on-Brown) as diagnostic traits for "Pre-Pueblo." In short, Mogollon 1 and 2 and a part of Mogollon 3 in Wheat's scheme, are lumped and at least one of the pottery types used for dating is placed somewhat late — all this aside from the quite inappropriate use of the Pecos classification terms (which were devised long ago for cultural periods of the Anasazi) as terms to denote time periods of the Mogollon culture!

This may or may not be a proper implication. Certainly there are few sites in Danson's tables that showed nothing but plain wares. Many of the early sites had Pueblo I and Pueblo II components as well as pre-Pueblo components and only excavation will indicate which component the Lino Gray and Neckbanded sherds belong with.

On the whole this report is important for the large amount of well-organized data, for the general outline of cultural movements in the area, and for a number of interesting ideas which should be tested in the course of future excavations.

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An Early Archaeological Site near Panuco, Vera Cruz. RICHARD S. MACNEISH. Transactions of the American Philosophical Society, n.s., Vol. 44, Part 5, Philadelphia, 1954. Pp. 539-641, 37 figs., 13 charts. $2.00.

There is a certain inaccuracy in the title of this monograph, for the site referred to, instead of being near

Panuco (west of Tampico in the Huastec Region of Mexico), is actually within the town itself and is part of the extensive and *continuous* archaeological deposits that underlie the central and northern portions of the town. The excavations reported must be considered as a further testing of what should be called the Panuco site, the same one that I cut into at another place in 1942 (Ekholm, 1944, Excavations at Tampico and Panuco in the Huasteca, Mexico, *Anth. Papers, Am. Mus. Nat. Hist.*, Vol. 38, Pt. 5). I am attempting to clarify here rather than to criticize — especially since I began the confusion by referring to the spot where I made my excavation as the Pavón Site. Nevertheless, MacNeish does not make it clear that we were both concerned with a single large site.

The excavation of 2 test trenches is reported. The first of these, located back from the river bank, was of minor importance, but the second, a cut down along the steep bank of the Panuco, showed cultural deposits to extend to a depth of 24 feet and provided the major evidence. Both cuts are fully described and very well shown in clear drawings and photographs that indicate carefully controlled excavations. It was primarily ceramic material that was found and this is very fully analyzed and is presented in what seems to me at times rather excessive detail. It is a report that is somewhat difficult to read and absorb.

I have cited above my own earlier publication because MacNeish's study is best explained by reference to it. My excavations at Panuco provided a sequence of 6 period subdivisions that were conceived of as running from the early Preclassic through to Conquest times with the earliest periods, I and II, belonging to the Preclassic. MacNeish's excavations were made at a point where the same and earlier Preclassic materials were found in much thicker deposits. He equates his uppermost levels with my Period I (which he renames the Chila Period) and divides the stratified materials found below this into 3 earlier periods, named in descending order Aguilar, Ponce, and Pavón. He therefore greatly enlarges the dimensions of the known Preclassic horizon in the Huasteca.

While it is clearly shown that these divisions in the sequence do occur, I am inclined to doubt that they are of the same magnitude as the "periods" I blocked out in my study. This breaking down of a stratigraphic sequence into phases or periods is in large part a subjective process and 2 separate workers are liable to make different kinds of divisions when they do not intimately know each other's materials. In analyzing the ceramic changes in my Panuco sequence I did not go nearly as far as MacNeish has done in his. At the time I was fully aware that the sequence could have been broken down more finely, but as I had contracted to do the field work and write the report in a certain limited time, I could carry the analysis through to only a major type classification. Little attention was given to changes of form or design that occurred within each of those more or less obvious groupings of types that I chose to call periods. MacNeish, on the other hand, has "wrung out" his material much more fully, and, perhaps also because his material comes from much deeper deposits, has arrived at a much more minute record of ceramic change. This is to his credit and all to the good, of course, but — more from seeing samples of his material than from reading his report — I have the very definite impression that his 3 periods are probably not the equal of mine. I would judge them to be rather subdivisions or phases of a single larger unit of a kind that in my way of doing things in 1942, I would have labeled a period. MacNeish was aware of this possibility, for at one point he suggests that his delineation of periods might be too fine, but by using the term and generally equating them with mine he gives, I believe, a somewhat exaggerated impression of the length and complexity of the Preclassic at Panuco.

Throughout his presentation of pottery types and figurines MacNeish indicates various outside relationships, finding notably a marked similarity between his Ponce Black type and the Black Ware of Lower Tres Zapotes and also between his Ponce and Aguilar period figurines and those of the Mamóm period at Uaxactún. These and other comparisons figure again in the last section of his monograph where he attempts to order in time the traits and the phase units of the several known Preclassic sequences of Mesoamerica. He was preparing this section when Wauchope's *A Tentative Sequence of Pre-Classic Ceramics in Middle America* appeared and he follows its division of the Preclassic into 3 stages, only substituting the term Temple Formative for Urban Formative. Two alternative correlations are given. The first of these places the Pavón and Ponce periods along with Lower Tres Zapotes, Mamóm and Yojoa Monochrome as earlier than Zacatenco I — El Arbolillo I, giving a priority to the cultures of the lowland regions. The second alternative correlation places these earliest phases of the lowlands and highlands as contemporaneous. MacNeish favors the first correlation, but I wonder if the evidence pointing in that direction does not arise from the selection of traits used in his ordering — and this in turn from his better knowledge of the Huasteca material.

The difficulties involved in trying to arrive at some culture-historical order in the Mesoamerican Preclassic result primarily from the paucity of information available. MacNeish's contribution has been to add materially to our knowledge of the period in one area and to attack with daring and skill the more general problems of the Preclassic. It is a highly significant addition to one of the most important problem areas in Mesoamerican archaeology.

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Fuentes indígenas de Méjico. Ensayo de sistematización bibliográfica. José Alcina Franch. Revista de Indias, Año 15, Nos. 61-62, Madrid, 1955. Pp. 421-521, 20 figs.

Catálogo de los códices indígenas del México antiguo. Miguel León Portilla and Salvador Mateos Higuera. Suplemento del Boletín Bibliográfico de la Secretaría de Hacienda, Año 3, No. 111, Mexico, 1957. 53 pp.

The literature on native Mexican codices is both large and complex. Many of the titles that have been published are unavailable in most libraries and many articles and even reproductions remain unknown because of their obscurity or rarity. A comprehensive bibliography has long been needed. The bibliography published by Noguera in 1933 listed only the larger and more important works; the catalogs of Mixtec, Zapotec, and Tarascan codices published by Lehmann in 1905, while still useful, are very much out of date.

The bibliography by Alcina Franch is presented as a preliminary attempt to systematize the classification of Mexican codices. The classification offers little novelty, with the codices grouped into 5 categories: Nahua, the Borgia Group, Zapotec, Mixtec, and manuscripts of other cultures. The Nahua manuscripts are subdivided into calendrical-ritual, tribute, historical, topographical, and Techialoyan types. In addition there are 16 entries under manuscripts written wholly or largely in Latin characters — far too small a list to serve any useful purpose. A full listing of published and partially published codices would more than double the number listed by Alcina Franch but certain omissions detract from the usefulness of the present compilation. Omitted, for instance, are the Códices Azoyú, the Florentine Codex, the important Mapa de Teozacoalco, the Tovar Calendar, the Plano en Papel de Maguey, and the Lienzo de Tlaxcala. For each of the 86 pictorial codices listed there is a discussion of its content, pedigree, and bibliography. The bibliography on particular items is generally quite extensive but with occasional omissions of important titles. Nevertheless, this is the largest and most useful compilation of its kind yet published.

The León and Mateos catalog is limited to pictorial codices that refer to pre-Columbian events or institutions. As is the case with the Alcina Franch compilation, the Mexican catalog is not intended to be either definitive or exhaustive. For each of the 61 codices listed the culture, present location, size, number of pages, the type of paper or skin, the content, and the editions, if any, are stated in summary fashion. The cultural classification of codices from the Valley of Mexico as Tenóchcatl, Mexicatl, Náhuatl, or Texcocano is a definite but speculative contribution. In particular cases the cultural attribution is doubtful, as when the Códice del Museo de América is termed Tlahuica, or Humboldt I is termed Mexicatl, rather than Tlapanec. The bibliography for each codex lists editions only and omits commentaries and other works. Nevertheless, a number of editions have been overlooked such as Silvia Rendón's edition of the Plano de Tlatelolco published as the *Ordenanza del Señor Cuauhtemoc* (1952, Middle American Research Institute, New Orleans), C. A. Burland's *The Selden Roll* (1955, Ibero-Amerikanische Bibliothek, Berlin), and G. C. Vaillant's edition of the tonalámatl of the Codex Borbonicus (1940, *A Sacred Almanac of the Aztecs*, Am. Mus. Nat. Hist., New York). Under each major cultural grouping the codices are classified as prehispanic or post-conquest. The particular attributions chosen are, at best, optimistic and controversial.

The publication contains an important announcement of a program which will make color slides, from the originals, of the codices listed in the catalog available from the Centro de Investigaciones Antropológicas de México.

These 2 bibliographies should be supplemented by the one compiled by Gerdt Kutscher and published in Burland's edition of the Selden Roll (reviewed by Proskouriakoff, 1957, Am. Antiq., Vol. 22, No. 3, p. 319) which lists 133 titles for 69 separate codices, and by the critical and important handlist of calendrical sources published by George Kubler and Charles Gibson in *The Tovar Calendar* (1951, Connecticut Academy of Arts and Sciences, New Haven). Each of these 4 listings contains data not present in the others.

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NOTES AND NEWS

EDITED BY CLEMENT W. MEIGHAN

GENERAL

As indicated in recent annual reports, the Carnegie Institution of Washington is withdrawing from the field of Middle American archaeology. On July 1, 1958, the offices of the Department of Archaeology at 10 Frisbie Place, Cambridge, Massachusetts, will close, and the Department will cease to exist. After that date all correspondence concerned with the past activities of the Department should be addressed to Carnegie Institution of Washington, 1530 P Street N.W., Washington 5, D.C.

This announcement from H. E. D. Pollock will be received with great regret by all Americanists. The contributions of the Carnegie Institution to American archaeology are immense and will remain for future scholars in the outstanding series of publications issued by the Institution. Termination of the Carnegie program is a major loss to American archaeology, and much additional effort will be required from other institutions if Mesoamerican research is to continue with the same scope as before.

A more encouraging report is that plans have been completed for the compilation and publication of all radiocarbon dates which have been published up to the present and which will be published during the next 5 years. The dates will be individually printed on 5 by 8 edge-punched cards so that they may be sorted in any fashion a subscriber may desire. Basic data will be precoded so that cards may be sorted by laboratory and laboratory number, by age, by location, and by scientific field in which the date may apply. Investigation and planning of this project have been carried out by a committee which originated at the International Radiocarbon Conference held in Andover late in 1956. The committee chairman is C. W. Meighan; the other members are Graham Clark, Edward S. Deevey, Frederick Johnson, Thor Karlstrom (U.S. Geological Survey), Alex D. Krieger, Hilde Levi (Copenhagen C-14 laboratory), and Therkel Mathiassen (Danish National Museum). In addition, advice has been requested from over a hundred scientists in all fields which may be concerned. Investigation has shown Andover to be best suited to the actual production and distribution problems, and detailed cost estimates have been prepared by Frederick Johnson. The general plan now calls for a market survey to discover how many subscribers are interested in this service; this will establish the cost and determine the size of the organization which will become responsible for the service. The committee is soliciting funds from foundations to defray the costs of the market survey.

An important new series of publications has begun to appear, issued by the Council for Old World Archaeology, under the general editorship of Lauristan Ward. Europe, Africa, Asia, and Oceania have been divided into 22 subareas, for each of which surveys and bibliographies of archaeological work will be published at the rate of 5 or 6 areas every 6 months, each area thus being reviewed at about 2-year intervals. *Current Work in Old World Archaeology* consists of short summaries of all important new research, from the earliest Paleolithic remains to the latest historic periods. *Current Publications in Old World Archaeology* consists of selected and annotated bibliographies. Both are intended for archaeologists who are specialists in other areas yet wish to keep abreast of Old World work, for scholars in other disciplines, and for interested laymen. Anyone not conveniently near a large library will find this service particularly helpful.

The areas covered in the 6 issues of *Current Work* and *Current Publications* already available are Central Europe, Eastern Mediterranean, Northern Africa, Western Asia, Northern Asia, and Indonesia. In May COWA will publish surveys and bibliographies of current work in the British Isles, European Russia, West Africa, Southern Asia, and the Pacific Islands. The price of a Survey and Bibliography for a single area is $1.00; subscribers, at $4.00 a year, will receive the survey and bibliography for about half of the 22 areas, the other half being issued the succeeding year. Orders should be addressed to the Council for Old World Archaeology, 11 Divinity Avenue, Cambridge 38, Massachusetts.

It is clear from the first 6 issues that COWA has at last provided the means for all who are not specialists in Old World archaeology to become familiar with all important developments there. The surveys are carefully organized by subarea or country and the bibliographies include detailed comments and short summaries, translation of titles in unfamiliar languages, and cross-referencing for quick and easy use. No longer can the Americanist complain that he lacks the time or means of keeping up with progress by his Old World colleagues.

It should be pointed out that COWA is a nonprofit corporation, with control vested in official representatives of 9 American organizations, one of which is the Society for American Archaeology. COWA will not publish articles or monographs, nor give grants for research. Also, the Council's funds are not sufficient to permit any complimentary subscriptions or exchanges.

This carefully planned venture in disseminating archaeological information in brief form, authoritative, and remarkably inexpensive, merits wide support. It sets a magnificent example of cooperative effort by a large number of scholars for the benefit of all who have an interest in the archaeology of the Old World.

The Fifth International Congress of Prehistoric and Protohistoric Sciences will be held August 24 to 30, 1958, in Hamburg, Germany. Inquiries should be addressed to Professor Gerhard Bersu, President of the Congress, at Palmengartenstrasse 10-12, Frankfurt am Main, Germany. In addition to the week of meetings, local excursions are planned.

The Fifth Annual Great Basin Archaeological Conference will be held at the University of Nevada, Reno. It is tentatively scheduled for August 26 and 27, to coincide with the symposium on the basin of ancient Lake Lahontan. For details write to Francis A. Riddell, State Indian Museum, 2618 K Street, Sacramento, California.

The 1958 Pecos Conference will be held at the University of New Mexico, Albuquerque, on August 15, 16 and 17. Accommodations, at very reasonable prices, will be available in an air conditioned dormitory. The program, still tentative, includes field reports and, symposia on Indian claims cases, salvage archaeology, and Early Man. A field trip to Pottery Mound is planned. The chairman of the conference, Frank C. Hibben, will welcome further program suggestions.

ARCTIC

Members of the Human History Branch of the National Museum of Canada carried out widely dispersed and highly productive surveys in the eastern and western arctic during the summer of 1957.

Yukon Territory. Richard S. MacNeish, assisted by Mark Molot and Reginald Hamel of Ottawa, operated in the area bounded on the west by the Alaskan border, on the north by Dawson and Mayo, and on the east by Mayo and Teslin Lake. They discovered 97 sites and collected 1000 artifacts. MacNeish divides these materials into 5 separate complexes ordered chronologically in relation to a layer of volcanic ash covering the southern portion of the area. The earliest cultural level he calls the Champlain complex. It occurs underneath a red humus, often in wind-blown sands, and consists of Agate Basin-like, Yuma-like, and Plainview-like points, together with heavy bifacial knives and scrapers. Above these remains, in the bottom of the red mature soil profile, lies the Little Arm Complex. This is a microblade culture with tongue-shaped polyhedral cores, a wide variety of microblades, leaf-shaped projectile points, a few burins, some triangular projectile points with concave bases and a single basal spur at one corner, small turtle-back end scrapers, and bifacial knives. This complex can probably be divided into two. MacNeish believes that the above inventory is similar to collections from Outer Mongolia, while other components seem more like Pointed Mountain on the Liard and the Campus site in Alaska. In these latter the projectile points are long and side-notched, burins are virtually absent, and the microblades are variously retouched.

The Gladstone complex, just barely below the volcanic ash layer, is next in sequence. It contains a few microblades and larger blades, polyhedral cores, but not the tongue-shaped type, side-notched and corner-notched points, and an extensive variety of large choppers, bifacial knives, and scrapers. The volcanic ash separates these first 3 levels from later manifestations. Directly above it is the Otter Falls complex, with large corner-notched points, large scrapers, bifacial knives and choppers, some sandstone scrapers, and a few bone tools. Still later and higher, in the modern humus, is the Aishihik complex. It has small, triangular side-notched and corner-notched arrow points, sandstone scrapers, thumbnail end scrapers, bifacial knives, and a great number of bone tools.

In addition to the above complexes, which are generally widespread throughout the area, there are several other sites which seem to represent different categories. One of these, deeply buried near the mouth of the Pelly River, yielded choppers and unifacial tools, including projectile points, in association with a possibly extinct variety of bison. Another probable complex from near Dawson, also deeply buried, produced a series of pebble choppers.

Ungava Peninsula. From mid-July through September William Taylor, accompanied by his wife, carried out survey work and limited excavation in the area of Payne Bay, Payne Lake, and Sugluk Inlet. On an unnamed island in the Payne Estuary several small, circular, heavy tent rings were excavated. These yielded Cape Dorset culture implements, but of paramount significance were Taylor's investigations of a grave that lay adjacent to one of these structures. His account follows: "[It] . . . was a grave of the long, rough stone vault type. Although looking quite like a Thule culture, it was excavated, and the skeleton, in fair preservation, collected. The chipped quartzite tools found in this grave indicate that the skeleton belongs to Dorset culture. Since the skull and mandible show Eskimoid physical traits, this burial constitutes the first concrete evidence relating the Eskimo physical type with Dorset culture. In short, some, although perhaps not all, Dorset culture people were Eskimos."

In the area of this same site Taylor observed but did not excavate a rectangular, semisubterranean house ruin with the remarkable over-all measurements of 85 by 31 feet. At the east end of Payne Lake 6 other sites were tested. Four produced Dorset materials, and 3 of the 4 had small, roughly rectangular semisubterranean houses. Along the first mile of the river 40 more Dorset houses were discovered. One was excavated and found to have a cold-trap passage that extended to a depth of 48 inches. Negative evidence suggests that these houses were roofed with wood and skins. Taylor also inferred that this was a winter occupation of the interior by Dorset people, because, in addition to the winter house type, he found a Dorset sled shoe. The bone sample showed a primary reliance on caribou. Recent Eskimo seasonal visits to this area were indicated by other tent rings, meat caches, ground slate blades, drill-perforated lance and bow parts, and metal fragments, together with an abundance of caribou bones.

During September the Taylors worked around Sugluk Inlet. Near the Hudson's Bay Company Post they found a single disturbed Dorset house, and on the southeast shore of the inlet another looted Dorset village site. On the northwest shore 2 small Thule winter villages were tested, but little was found. On Sugluk Island 3 more Dorset sites were discovered, and, again, these had the small, rectangular, semisubterranean house type.

Taylor suggests that two of the Sugluk Dorset sites are contemporary with the T-1 site on Southampton Island, and two of the others appear to be somewhat younger, although quite within the Dorset time range.

Assembled by ELMER HARP, JR.

WEST COAST AND GREAT BASIN

CALIFORNIA. As part of a cooperative program of instruction in museum and archaeological procedure the California State Indian Musem has been directing students in salvage of the Mustang site (4-Yol-13) located at the confluence of the Sacramento and Feather Rivers. Francis A. Riddell, Curator, State Indian Museum, is directing the project, with Richard H. Reeve, Head, Department of Anthropology, Sacramento State College, as codirector and William H. Olsen as research assistant. The most significant result at the Mustang site is the discovery of a Phase 1, Late horizon cemetery. Over 50 burials with quantities of specimens serving as grave complement have been recovered, and a number of others are yet to be removed. The sample recovered from this cemetery will allow a fuller description of Phase 1 of the Late horizon.

The History Section of the California State Division of Beaches and Parks under Aubrey Neasham, Historian, and Jack R. Dyson, Assistant Historian, has let contracts to William J. Wallace of the University of Southern California for an archaeological reconnaissance of the Anza section of the Anza-Borrego Desert State Park in San Diego County, and for the completion of archaeological research at the Hugo Reid Adobe at Los Angeles. Other contracts went to Clement W. Meighan for archaeological survey in the Borrego section of the Anza-Borrego Desert State Park, and to William M. Harrison for excavation at La Purisima Mission State Historical Monument and the Jalama Winery. The Division of Beaches and Parks also is currently negotiating for the salvage of historical Chinese structures at Newcastle, California, and for salvage of archaeological materials associated with the Chinese occupation of this area. This work is necessitated by highway construction under the Federal Aid to Highways Program.

A. E. Treganza, acting for the University of California Archaeological Survey under contract with the National Park Service, has completed one season's salvage excavation in the Upper Trinity River Region and has begun salvage excavation in the Coyote Valley Reservoir area. Tentative results of the Trinity River excavation indicate that the region was not occupied in early times, that is, during the Early or Middle horizons in the Central California sequence. Evidence from what appear to be late prehistoric and early historic deposits points to relationship with people like the historic Wintu of the Upper Sacramento River Region rather than with Northwest Coast-oriented groups. Excavations are also being continued at a Middle horizon site on San Francisco Bay (ALa-328) by San Francisco State College under Treganza's direction.

The Department of Anthropology of the University of Southern California has been given a contract by the National Park Service for continuing work in Death Valley National Monument, and for beginning a survey in Joshua Tree National Monument. The work is under the direction of William Wallace. Wallace also reports excavations in progress at a large, badly disturbed, campsite at Saratoga Springs in Death Valley. The materials recovered fall into the Death Valley Period III, known previously only from the excavations of 2 stone burial mounds in central Death Valley.

OREGON. Luther Cressman reports that field work in the Tillamook area during 1958 will continue the Oregon Coast Prehistory Project, under a grant from the National Science Foundation. It is planned to excavate another large house pit, approximately 20 by 55 feet, in this village of 12 or more houses, to clarify the type of house structure, shed or gable, in use with these multifamily dwellings. The last season's work strongly indicated a shed type structure but the evidence is not at present conclusive.

Plans are under way for an extensive salvage program in cooperation with the National Park Service in the John Day reservoir on both sides of the Columbia River. The area is 75 miles long, extending from The Dalles reservoir to the McNary. The program will probably cover 5 field seasons and will give a complete archaeological coverage of the Columbia from The Dalles to the upstream end of the McNary reservoir. A reappraisal of the archaeological sites in the John Day area to determine the amount of destruction by collectors since the River Basin Survey of 1950 was made during the Christmas vacation to serve as a basis for further planning.

IDAHO. Earl Swanson, director of the museum at Idaho State College, is preparing an archaeological survey for Idaho. The planned program of systematic surveys and excavations in Idaho will be very welcome in this archaeologically little-known area.

WASHINGTON. Excavations at Priest Rapids on the Columbia River, under the direction of Robert Greengo, University of Washington, will continue next season.

Richard Daugherty, State College of Washington, reports plans to continue excavations in the Ice Harbor Reservoir for another season under a contract with the National Park Service. In addition, the State College of Washington will have crews conducting excavations in Pend Oreille County, Grant County, and at a coastal site on the Olympic Peninsula of northwestern Washington.

BRITISH COLUMBIA. Charles Borden, University of British Columbia, reports 4 new radiocarbon dates from Dr. K. J. McCallum, University of Saskatchewan:

The initial date for Tselax Village, reported earlier, has to be revised. Additional measurements show that the sample has an age of 660 ± 130 years (instead of between 500 and 600). Thus, A.D. 1300 may be taken as the approximate beginning of recent Coast Salish culture in the Fraser delta area. The sample from the upper

horizon at the Whalen Farm site yielded a date of 1580 ± 140 years (A.D. 377). The sample from the early horizon at Whalen Farm (bits of charcoal from a depth of 10 to 12 feet) measured at 2450 ± 160 years or 493 B.C. This date makes this deposit virtually contemporary with Locarno Beach (476 B.C.). Both are components of what we have been calling the "Early Maritime" culture of the Gulf of Georgia.

Borden states that these dates plus the 2 he has for the Marpole site (A.D. 5 and 144 B.C.) will enable him to construct a tightly knit sequence for the area. Borden also reports that a radiocarbon date from an early man site near Yale, B.C., gives an age of 8150 ± 310 years for the sample (charcoal).

NATIONAL PARK SERVICE. Arnold and Reeve of Sacramento State College are continuing their excavations at Monticello in the Berryessa Valley, California. Albert Elsasser will carry out small-scale excavations on Alder and Prosser creeks north of Truckee, California, and on the East Fork of the Carson River on the border of California and Nevada. Clement Meighan and David Pendergast, University of California of Los Angeles, made a site survey of the West Fork of the Mojave River with negative results. Meighan will excavate a site in the Terminus Reservoir on the Kaweah River in Tulare County, California.

The National Park Service is at present initiating a contract with the University of Alaska to carry out a historical-archaeological excavation on the old Russian graves and Sitka Fort at Sitka National Monument.

Leland J. Abel has been transferred from Mesa Verde National Park where he was Archeologist to the San Francisco Region Four office, where he has taken the position of Museum Curator (Records).

With an increase in Flood Control measures by the Soil Conservation Service under the Watershed Protection and Flood Prevention Act, Public Law No. 556 of the 83rd Congress, there will be an increased number of reservoirs constructed which will require additional archaeological salvage work on the part of the various institutions which already have contracts with the National Park Service.

Assembled by R. D. DAUGHERTY

SOUTHWEST

ARIZONA. E. B. Sayles, Curator of the Arizona State Museum, Tucson, began a 6-months leave in September to continue research on prepottery cultures. Field work is being done in Texas with local archaeologists, geologists, and paleontologists. Later, studies of archaic collections in some of the eastern museums will be undertaken.

Charles C. Di Peso, Director of the Amerind Foundation, is inaugurating a long range archaeological program in the Casas Grandes area of northwestern Chihuahua, Mexico. The program, planned in cooperation with the Mexican Instituto Nacional de Antropología e Historia, should be initiated early in 1958. Students of Southwestern and Mexican cultures alike are looking forward to the results.

The Chicago Natural History Museum, after completing its first season's excavations near Vernon, Arizona, under the leadership of Paul S. Martin, plans to return next season to the same general area. Laboratory facilities and a bunkhouse for students have been constructed at the permanent headquarters.

Albert Schroeder, of the National Park Service, assisted by Paul Ezell, San Diego State College, made an archaeological survey of the Painted Rocks Reservoir basin on the lower Gila River in December.

Edward B. Danson, Assistant Director of the Museum of Northern Arizona, reports considerable archaeological activity in the Flagstaff area. In addition to cooperating in the Upper Colorado River Basin Archaeological Salvage Project (described below), the following accomplishments are noted. David Breternitz, Archaeologist, assisted by William Lipe, summer assistant at the Museum, and Zorro Bradley, Wupatki National Monument, excavated 3 pre-eruption pit houses at Sunset Crater National Monument. It was hoped that they could be used in the interpretive program, but they were not of sufficient interest and have been refilled.

Breternitz has also completed excavations on Clear Creek, 10 miles southeast of Camp Verde in the Verde Valley. This site, first tested by Byron Cummings, was called to the attention of the Museum of Northern Arizona by Howard Wingfield of Camp Verde, who noticed what seemed to be pit houses in the walls of a waterline trench dug for a new tourist court. Excavation uncovered 6 houses and portions of 2 others. Three of these resemble Hohokam structures of the Santa Cruz and Gila Valley. In storage pits in one house were found a Santa Cruz Red-on-Buff miniature jar and a Kana-a-like black-on-white jar. The other structures had no basic Hohokam similarities. Two houses of a later period were tested, and subsequently one was completely excavated. These houses were built of stone slabs set on end; the walls probably never stood more than 1 m. high. A D-shaped antechamber was connected with the excavated house.

Highway salvage work in Arizona is under the direction of the Arizona State Museum in Tucson, but the Museum of Northern Arizona has agreed to examine any highway construction in the northern part of the state. Tests for material pits along the new right-of-way of Highway 89 north of Flagstaff produced evidence of prehistoric occupation. The Coconino County Forest Service contacted the Museum, and excavations there uncovered what appears to be a large pit house or a "kiva." The pit house, nearly 5 feet deep and 28 feet in diameter, is cut into a red cinder hill. Four large postholes and a firepit occur in the floor. Nearby was a small pit house with a clay-lined firepit and postholes along the edge of the building. Although the small house did not have an entrance or ventilator shaft, it is not dissimilar to early Sinagua houses. Pottery is entirely Rio de Flag Brown, which seems to date from roughly A.D. 600.

The 13th annual session of the University of Arizona Archaeological Field School at Point of Pines will be held this summer from June 13 to August 8 under the direction of Emil W. Haury with Raymond H. Thompson as Assistant Director.

New Mexico. The 1957 Texas Technological College Archaeological Field School, directed by Fred Wendorf, was conducted at Pot Creek, 10 miles south of Taos, New Mexico, last summer. The group excavated the main structure of a pre-Civil War U.S. Army post (1st Dragoons). After excavation, the building was restored and will serve as a museum and research center for future operations in the vicinity. Some time was spent in an archaeological survey and in testing a large late site. The project is being financed by the Wichita Foundation.

Frank C. Hibben directed the 1957 University of New Mexico field session which involved excavations at 3 sites. The main excavation was at Pottery Mound, a Pueblo IV site southwest of Albuquerque. Sampling of rooms and other features was continued for the third season under the supervision of Gwinn Vivian. The principal work of the summer consisted of the recovery of a large series of mural paintings. Six kivas have been found at Pottery Mound, all of them with paintings on their walls. Three of the kivas were elaborately painted with multiple layers of paintings recoverable. The Pottery Mound series is the largest and most elaborate group of pre-Spanish kiva paintings yet found.

The second University of New Mexico excavation was carried on by William Roosa at the early man site near Lucy, New Mexico, at the southern end of the Estancia Valley. Additional geological evidence of the stratification was recovered. Another fluted Sandia point was found in place, as well as a scattering of later types of projectile points. Unfortunately, no Clovis fluted nor Folsom points were found in place, although these types appear on the site.

The third New Mexico project was carried on by Roger Green, who continued excavations in the Gallina area of north central New Mexico on the important group of structures on Starve-out Ridge. This party found a most interesting situation in one of the pit houses excavated. A pile of 10 skeletons, obviously not formal burials, was found on the floor. Hands and feet of several of these individuals had been cut off, apparently as trophies. This situation is similar to that which was discovered by the University excavations at Rattlesnake Point some years ago.

The most active program in archaeology at the Laboratory of Anthropology and Museum of New Mexico, Santa Fe, continues to be salvage archaeology. Highway salvage under Stewart Peckham continues on a full-time basis. In October a great kiva in a late Pueblo III site near Fort Wingate, on U.S. Highway 66, was cleared. The circular structure is smaller than the average great kiva, only 38 feet in diameter below the bench, but still has the characteristics which place it in that category: 4 masonry roof supports, a large masonry firebox, one masonry-lined floor-drum or vault (a second probably existed, but had been robbed for stone), and several subfloor pits similar to some found in great kivas at Chaco Canyon. Missing is the northern antechamber, although this may have been replaced by a small kiva 15 feet north of the great kiva and directly in alignment with the north-south oriented features of the great kiva. Also lacking are wall niches and any definite indication of method of entry. The latest associated pottery types are Klageto Black-on-White and Querino Polychrome, while the earlier types ran the gamut of the Puerco-Chaco series of Cibola White ware, in addition to ancestral types of Klageto and Querino. Although the great kiva appears to have been in use during the latest occupation of the site, parts of the walls, bench, and pillars were robbed of stone for use elsewhere, although no later sites were noted in the immediate vicinity.

The proposed excavation of 2 sites near Jemez Pueblo was canceled due to the fact that both sites are still occasionally used as shrines by the Jemez Indians. The sites are located in a borrow pit area of a highway construction project. The borrow pit will still be worked, but the 2 ruins will be fenced off so that they will not be disturbed by the construction work.

Upper Colorado River Basin Project. Three Southwestern institutions report upon activities in connection with this project which is being sponsored by the National Park Service. A. E. Dittert, Jr., of the Museum of New Mexico, is currently working up material from last season's field work on the San Juan River, and will continue further survey and excavation in the Navajo Dam area in the spring.

The Museum of Northern Arizona has employed William Y. Adams to conduct an archaeological survey of that portion of the San Juan River basin which will be flooded by waters from the Glen Canyon reservoir. Maurice E. Cooley, a geologist, is working with Adams to correlate the geomorphology of the canyon with the archaeology, and special attention is being paid to late Cenozoic deposits. The survey of the Glen Canyon proper has been completed and 2 reports by Gene Foster are being prepared. More than 250 prehistoric sites have been recorded in Glen Canyon and in the San Juan canyon, some of which were previously reported upon by Steward, the Rainbow Bridge-Monument Valley Expedition, and other surveys.

James Gunnerson states that a laboratory has been established at the University of Utah to handle archaeological materials from last season's salvage operation along the north bank of Glen Canyon, and for processing of materials concurrently with field work during subsequent digging seasons. It is anticipated that salvage activities will be significantly increased during the 1958 season, including both survey and excavation.

Colorado. The University of Colorado will conduct its 10th Field Session in Archaeological Reesarch this

summer from June 13 to July 18 under the leadership of Robert H. Lister. Plans are being developed to excavate a site in southeastern Utah near Glen Canyon.

Assembled by ROBERT H. LISTER

PLAINS

The 15th Plains Conference for Archaeology, under the chairmanship of Wesley R. Hurt, met jointly with the American Indian Ethnohistoric Conference at the University of Nebraska November 28-30, 1957. More than 85 persons registered. At the first session, chaired by Franklin Fenenga, the following persons reported 1957 field activities, in the areas noted in parentheses: Richard G. Forbis (Alberta), Boyd Wettlaufer (Saskatchewan), Raymond C. Bentzen (Wyoming), Robert L. Stephenson, William N. Irving, Warren W. Caldwell, Harold A. Huscher, Robert W. Neuman (all Middle Missouri), Marvin F. Kivett (Nebraska), Carlyle S. Smith (Kansas), James H. Howard (Kansas), James B. Shaeffer (Oklahoma), Richard A. Marshall (Missouri), and W. Raymond Wood (Missouri). Harold Janzen of the University of Nebraska State Museum reported on a technique for making acrylic casts of small museum specimens.

The morning session on November 29 was a panel discussion devoted to archaeological foci in the Middle Missouri area and on the James River of North Dakota. Participants were Carlyle S. Smith (Chairman), Wesley R. Hurt, Roscoe Wilmeth, Richard P. Wheeler, W. Raymond Wood, and Alfred W. Bowers. The afternoon session was concerned primarily with the historic and prehistoric Arikara, and was thus in part related to the discussions of the preceding session. Papers were given by Everett Sterling, Albert C. Spaulding, Donald J. Lehmer, W. Raymond Wood, W. S. Laughlin, Marvin F. Kivett, Alfred W. Bowers, James H. Howard, and Preston Holder.

The evening of the 29th a session at the Nebraska State Historical Society was addressed by James C. Olson on the subject "Clio in the Field," a discussion of the scholarship of historic analysis. Frank Hibben showed slides of work on kiva murals in New Mexico.

The morning session on November 30, chaired by G. Hubert Smith, was devoted to reports on recent investigations of historic sites. Wilcomb E. Washburn discussed interpretive methods that have been applied in the Colonial area, especially at Williamsburg and Jamestown. His paper was followed by accounts (some of them illustrated) of work at Fort Osage, Missouri, by the Native Sons of Kansas City, reported by James Anderson; new excavations at Fort Snelling for the Minnesota Statehood Centennial Commission, reported by John Callender; excavations at Fort Atkinson, Nebraska, reported by Marvin F. Kivett; investigations in the region of Chadron, Nebraska, and the establishment of the Museum of the Fur Trade there, reported by Charles E. Hanson, Jr.; and work at various historic sites near Fort Robinson, Nebraska, by Roger R. Grange, Jr., of the Fort Robinson Museum. General progress in historic sites investigations was then summarized by Merrill J. Mattes, Regional Historian of Region Two of the Park Service, with respect to both accomplishments thus far and prospects for future work.

The final session, chaired by Roscoe Wilmeth, was devoted to general papers, as follows: Maria Wille, "The Woods Site, Kansas"; Richard P. Wheeler and Harry E. Weakly, "Birdshend Cave, Wyoming" (this paper included treering dates at variance with currently favored hypotheses); Richard P. Wheeler, "Radiocarbon Dates and Northern Plains Prehistory"; Mett Shippee, "An Introduction to an Early Lithic Complex in Central Missouri"; William Mulloy, "Archaeological Investigations in the Glendo Reservoir, Wyoming"; and Harold A. Huscher, "Generic Names in Plains Tribal Nomenclature."

Henry Hamilton was elected Chairman of the 16th Plains Conference, which is to be held in Lincoln on Thanksgiving weekend, 1958.

WYOMING. Raymond C. Bentzen, President of the Wyoming Archaeological Society, reports that the society was founded in 1953 by a group of people from Sheridan and vicinity but is now state-wide. In 1957 the society excavated the Little Bald Mountain site in the high country of the Big Horns. Stone-lined fire pits, bison bones, and numerous artifacts were found. On the basis of point typology it is believed that the heaviest usage of the site took place from about 500 B.C. to A.D. 500, with occasional occupation into historic times.

Lou Steege, archaeologist of the Wyoming State Historical Society, reports that the Wyoming State Museum in Cheyenne is becoming active in the archaeological field. Recent activities include the excavation of a stratified site on Rawhide Butte, Goshen County, eastern Wyoming, in August, 1957. Two distinct components were identified, which are much like Signal Butte II and III. In September a bison trap in Laramie County was examined and will probably be excavated in 1958.

KANSAS. Roscoe Wilmeth of the Kansas State Historical Society Museum is continuing his survey of the Kansas River Valley, and has found sites representing Woodland, Kansas City Hopewell, Central Plains, and historic Kansas occupations. This winter and spring he will make a survey of the Pomona and Melvern Reservoirs in east central Kansas, and will test at the Shungnunga site in Topeka which is to be affected by a local flood control project and a new city park.

OAHE RESERVOIR AREA. A salvage project on the Middle Missouri in South Dakota which did not receive adequate mention in the last Notes and News was the work at the Anton Rygh site, north of Mobridge, in the summer of 1957 by a University of Idaho-National Park Service party under Alfred W. Bowers. Rygh is a fortified village site with 3 components. The oldest is the Lower Grand horizon, an early Mandan culture identified by Bowers with the Alaska focus of other workers. The Lower Grand, under the influence of cultures in the Heart River area to the north, developed into the Upper

Grand horizon, which Bowers equates with the late part of the Le Beau focus. The Upper Grand occupations ends with the abandonment of the site by the Mandan at the beginning of the Trade period. Shortly afterward the site was occupied by the Arikara for a few decades, and then permanently abandoned. Rygh is a strategic site for a study of the time of first European trade contacts.

Assembled by E. Mott Davis

UPPER MISSISSIPPI VALLEY

Illinois. A meeting of the Illinois Archaeological Survey was held at Urbana on December 7 and 8. William Beeson, Salvage Archaeologist for the University of Illinois, and James Gillihan, Salvage Archaeologist for Southern Illinois University, reported on the first highway salvage project to be carried out in the state. The site being excavated is near Lawrenceville, Illinois, and is apparently of the Middle Woodland horizon. The current status of the highway salvage program in Illinois was discussed and future work outlined. On Sunday, December 8, a discussion of Late Woodland or post-Hopewell pottery in Illinois was discussed under the chairmanship of J. B. Griffin.

Missouri. Field work continued in the Pomme de Terre and Table Rock reservoirs areas and at Research Cave during the fall. In the reservoir areas, the most interesting find was large square houses that appear to be typical of the Spiro focus. The 2 houses dug had 4 large center posts and had entrance ways. Both were near a mound which preliminary investigations revealed to have some kind of rectangular structure on its top — perhaps an embankment, 60 by 83 feet. It is planned to continue work in the spring of 1958.

The excavation of Verkamp Shelter near St. James, made possible by a grant from the Lucy Worthington James Foundation, produced information on 4 different occupations in the central highland area. At the top was evidence of Mississippi occupation preceded by Highland aspect, then a Middle Woodland level and a nonceramic occupation at the base. The bottom of the shelter deposit has not yet been reached although digging has gone to the 6-foot level.

Enough Highland aspect sites were located and investigated to propose the Maramec Springs focus, with the following features: burials in earth mounds or in family cemetery areas; burials semiflexed and with grave goods; villages having refuse areas 25 feet or more in diameter; bell-shaped refuse pits; crushed limestone-tempered pottery with cord-wrapped paddle impressions, in shapes including deep bowls and ollas with straight or recurved rims and globular or conoidal base; mussel shell oval "buttons"; mussel shell spoons; small corner-notched arrowheads; and clay elbow pipes.

Research Cave in north central Missouri continued to yield dry materials in the upper levels. A desiccated child burial in a grass-lined pit, covered with a fiber-twined mat and wrapped in a cloth robe, was one of the more interesting finds. This is now on display in the University's Museum of Anthropology, along with wooden double-ended paddles, an ax handle, a grass sandal, and fragments of netting and other weaving. This dry material appears to be associated with the late Woodland, post-Hopewell occupation of the cave.

At the October meeting of the Missouri Archaeological Society, Marvin E. Tong., Jr., was given the Society's Achievement Award for 1956. Professor Jesse E. Wrench was re-elected President for the 23rd consecutive year, Carl Chapman was elected Secretary, and Richard O. Keslin, Treasurer. A new chapter, the Maramec Springs Chapter, was started and served as host at the meeting.

Assembled by M. L. Fowler

NORTHEAST

Massachusetts. During the late summer and early fall of 1957 the Boylston Street Fishweir was rediscovered. Stakes were found in excavations for caissons during the construction of the IBM Building on the corner of Clarendon and Boylston Streets in Boston. Frederick Johnson reports, "We followed the excavations closely and have a record of the distribution of the stakes as far as could be determined. The location of the stakes was only fifty or sixty yards from those found in the New England Mutual Life Insurance Company Building's excavations."

The geological aspects of the Archaic village (Wapanucket site) at Assawompsett Lake in Middleboro have been studied by Richard J. Lougee, of Clark University. This study and the dates of several carbon samples, which have been submitted for analysis, will provide important information on this period of New England's Indian occupation.

New Jersey. Work has just been completed on a small Late Archaic site (Alpine Terrace) by Julius Lopez, Michael Cohn, Stanley Wisniewski, Harry Trowbridge, and Julius Diosi. A shellheap is the principal feature of the site which lies about 50 feet above the Hudson River over the cliffs of the Palisades. Some broad projectile point types were found, as well as a few "fish-tails," and some triangular points from the top and bottom of the midden. Most of the points, however, are narrow side-notched and stemmed forms; these occur at all levels. Other objects recovered are a notched ax, a notched stone club, rough adzes, a polished adz (?) fragment, sundry choppers, a fragment of an unfinished bannerstone, pitted and unpitted hammerstones, various thick, ovoid blanks rudely flaked by percussion, and a few drills and scrapers. Locally gathered stones, including Hudson Valley flints, were used for most of the implements. Only a few points are made of jaspers and argillites presumably from Pennsylvania and lower New Jersey. Items of bone are confined to 1 joint and 3 splinter awls. Sherds, belonging to about 3 early-type vessels, occurred in the top half of the shells. One sherd is reminiscent of Ware Plain, best known in southern

New Jersey; the others are Interior Cord-Marked and similar to Vinette I.

NEW YORK. Two historic sites were investigated during the summer of 1957.

Since September of 1956, Roland W. Robbins has been digging at the site of Philipsburg Manor, Upper Mills, in North Tarrytown. The Manor is owned by the Sleepy Hollow Restorations, a subsidiary of the Rockefeller Foundation. The first stage of the Manor restoration took place during the 1940's. The work is now being carried further. The excavations are unearthing a series of docks going back to the original built in 1683 when Frederick Philipse began the building of his Dutch estate and trading post. A log road and bridge have been uncovered which led from the shore out to the earliest dock. Locations of early buildings have been determined and the original topography of the site is being revealed.

The Dutch way of life prospered here for nearly a century, terminating during the Revolutionary War. Numerous different trade items have been found, among which are: shoe leather, earthenware, stone ware, salt glaze, delft, slipware, porcelain, bottles, nails, hinges, left-handed sickles, buttons, buckles, horse shoes, gun flints, sleigh bells, clay pipes, and a jew's harp.

Johnson Hall, Johnstown, New York, one of the outstanding landmarks of Colonial America, was built by Sir William Johnson in 1763. It has associations with many of the events leading to the Revolutionary War and with innumerable notable personalities of that period of our history. During August and September archaeological investigations were carried on at Johnson Hall by Paul R. Ducey, St. Lawrence University, Canton, assisted by Louis Ismay, Rensselaer County Junior Museum, Troy. The initial phases of the work involved a survey of the estate in an attempt to locate former building sites and excavation for structural remains. The results of the past season included the location of a former tunnel which had connected the Hall with one of the flanking stone block-houses; the site of the old blacksmith shop; and the structural remains of another building. The work was sponsored by the Division of Historic Sites of the New York State Education Department, as part of a general reconstruction program.

The development of Oneida Iroquois culture is being investigated by Peter P. Pratt. It has been postulated that the 3 eastern Iroquois tribes shared a common cultural base and that the Mohawk separated from this during the late Chance period. Pratt is accumulating evidence indicating a separation of Oneida-Mohawk in the vicinity of Otsego Lake. He says he "has traced the migration route of the Oneida for approximately 100 miles of waterway including Cowaselon and Oneida Creeks and Sangerfield, Unadilla, and Susquehanna Rivers." He also recognizes 2 branches of Oneida (eastern and western) in late prehistoric time. The eastern branch moved toward the Stockbridge Valley where the majority of historic Oneida villages were located. The western branch moved toward the historic Onondaga area. Community size, palisade features, dated European objects, and cross references with documented sites in adjacent areas may result in the historic identification of certain Oneida settlements.

During the early fall of 1957, a house floor plan was exposed within a terminal Chance horizon component in the development of the early Oneida culture. This site is located on the Eaton farm near Sangerfield in Madison County. Walter Bennett, Walter James, James Peterson, William Ennis, and John Litzenberger have aided Pratt in this work. The structure was oval and "double walled," its long axis oriented east and west. A sleeping platform about 5 feet wide extended the length of the north wall. The length of the house was 30 feet; its width approximately 17 feet. A single doorway 5 feet wide, was located at the western end of the south wall.

PENNSYLVANIA. During the fall of 1957, the Pennsylvania State Museum and several members of the Lower Susquehanna Chapter of the Society for Pennsylvania Archaeology have been excavating on Upper Bear (also spelled Bare) Island. The island, owned by the Susquehanna Electric Company, is situated off Martic Township, Lancaster County, in the Lower Susquehanna River. Shortly after hurricane Hazel uprooted a large hickory tree on the edge of the site artifacts were discovered in the mass of earth clinging to the tree roots by Barry Dent and David Halley of York. Subsequent exploratory work at the site indicates that intensive excavations will be extremely productive.

The geology of the area is quite interesting. During the Postglacial optimum, the water cross-cut channels into the bedrock at a gradient greater than the present artificial water level and also scarred the island with potholes. The site is situated in a sheltered area about 25 feet above the present water level at the confluence of 2 such channels. The soil profile consists of a 2 to 3 inch humus or duff layer, a 4 to 8 inch orange, fine-grained sand layer, and below these a 15 to 24 inch zone of black organic sand. A pebbly sand, containing numerous rounded foreign pebbles, lies beneath the sandy layers. Apparently no true B zone is present. The island is bedrock of the Wissahickon mica schist formation, and numerous angular fragments of this material are found in both the orange and black soil zones. Spore studies of the black organic zone, by the Pennsylvania State Geological Survey, indicate 5% to 15% organic content with grass, bloodroot, oak, beech, and other pollens present. This is indicative of a flood plain type of environment and of a previous forest floor. This zone contains the majority of the artifacts.

The small portion of the site that has been worked has yielded over 200 chipped, ground, or pecked stone artifacts. The range includes; projectile points, 5 banner-stone fragments, numerous soapstone fragments, several picks or choppers, 2 pestles, a three-quarter grooved axe and many hammer stones. The high proportion of whole and broken projectile points to a relatively small number of flakes makes it clear that the site was a habitation area and not a workshop. The most distinctive projectile

point type found is similar to the long, slender, narrow stemmed point of the Poplar Island type as described by Witthoft. The principal material used is siltstone, and only occasionally quartz and rhyolite. A few corner-notched points with broad bases as well as some semi-lozenge-shaped, "fish-tail" types have also been recovered. It is believed that these represent subdivisions of a local Archaic tradition.

The Society for Pennsylvania Archaeology is planning a symposium on Susquehannock history and prehistory as an annual meeting of the Society. This will be held during the last week in May at Franklin and Marshall College, Lancaster. Papers dealing with the ancestors of the Susquehannocks, physical types, pottery types, and the historical position of the Susquehannocks, as well as several site reports will be presented.

Assembled by A. K. GUTHE

SOUTHEAST

FLORIDA. *University of Florida*: The summer session under John M. Goggin excavated an apparent substructure mound at the Cross Creek site. The site includes a village midden, a burial mound which has yielded Weeden Island period materials, a semicircular ditch about a hundred yards from the burial mound, and the substructure mound. The latter produced Weeden Island period sherds only, and these were from midden included in the fill.

Salvage work on an Alachua period midden in the right-of-way of a highway widening project was begun in December.

Florida State Museum: Ripley P. Bullen excavated a site ranging from preceramic through later ceramic horizons near Gainesville. The work, in an area to be disturbed by the widening of a major highway, was performed as part of the cooperative efforts of the Florida State Road Department and the Florida Highway Archaeological Salvage Committee. Labor was provided by the State Road Department.

St. Augustine Historical Society: John W. Griffin left his post as Executive Historian January 1, 1958, to assume the duties of Regional Archeologist, Region 1, National Park Service.

GEORGIA. The fifth summer field session of the University of Georgia at Etowah will be directed by A. R. Kelly in 1958. Work will center in several large communal cooking pits, the earliest occupation in the Mound B Plaza. James H. Kellar recently surveyed a "stone circle" and enclosed central stone mound on Pine Mountain, Harris County. The site is one of several stone circles in Georgia, others being in Habersham and Putnam counties.

Fort Benning Military Reservation: David Chase and Dick Larner, Fort Benning personnel, have made surface collections and occasional test pits in reservation sites, finding a strong preponderance of transitional Early Woodland and Woodland sites. David Chase reported the presence of Weeden Island sites on Uchee Creek at the fall meeting of the Southeastern Archaeological Conference.

Georgia Historical Commission: Except for continued explorations at Mound C, Etowah, with Lewis Larson in charge, the 1957 program centered on several museum construction projects. These include a $60,000 museum at Etowah and restoration of New Echota, including the Worcester House, the print shop of the "Cherokee Phoenix," and the Vann House. Funds are also available for a colonial museum at Midway and the Old Eagle Tavern at Watkinsville.

KENTUCKY. *University of Kentucky*: Douglas Schwartz reports that the Museum of Anthropology has in the last year completed new exhibits on Archaic, Adena, Middle Mississippi, and Fort Ancient cultures. The university has recently signed a contract with the National Park Service for surveys in the Barkley and Rough River reservoirs, and is negotiating a contract with Mammoth Cave National Park to set up an archaeological program for that area. The objectives of the program would be to provide the Park Service with the broad outlines of the archaeological materials in their region. This will entail a review of previous work and new research to fill out the picture. The Museum is also initiating a state-wide archaeological survey which will utilize amateur help extensively.

William Behringer Memorial Museum: Late this past summer the museum selected for excavation a very large mound which is believed to be early Adena, on the basis of pottery found to date. The mound is one of the larger structures in northern Kentucky and is situated in the northern part of Boone County on the second terrace of the Ohio River.

TEXAS. In the fall of 1957, 2 field parties were active in river basin salvage in the Caddoan area of East Texas, at the McGee Bend Reservoir on the Angelina River in central East Texas, and at the Ferrell's Bridge Reservoir on Cypress Creek in northeast Texas.

At McGee Bend, a National Park Service party led by Edward B. Jelks and John Graham was in the field from early in September to the middle of November. Four sites were partially excavated on the north side of the reservoir in the Attoyac River-Harvy Creek area, some 25 miles upriver from the area investigated last fall by the National Park Service. Three of the 4 were double component sites, consisting of a preceramic Archaic component underlying a ceramic component in each case. The fourth site contained evidence of European contact and is possibly attributable to the Ayish Indians.

On November 18, the National Park Service party moved to Ferrell's Bridge Reservoir where a month was devoted to testing mounds at 2 different sites. The northwest quadrant was removed from the single mound at the Sam Roberts site, where evidence of a burned structure was found. The smallest of a group of 4 mounds

at Site 41UR10 was partially excavated, and test trenches were sunk in the terrace adjacent to the mound. The small mound, which apparently was for mortuary purposes, contained a burial with ceramic offerings, and it is possible there are other burials in the unexcavated portion of the mound. Titus focus (Fulton aspect) affiliation is indicated for both 41UR10 and the Sam Roberts site.

Meanwhile, a University of Texas-National Park Service party led by E. Mott Davis, with Bernard Golden as assistant, had planned to excavate a number of sites in the bottom land of the Ferrell's Bridge Reservoir area, but was driven to higher ground by unprecedented downpours and flooding. Work was concentrated at the McKinney site, 41MR12, a Titus focus burial and midden site of about A.D. 1400. Heretofore, knowledge of the Titus focus has come almost entirely from excavation of burials, so that work in the midden should contribute new information on the focus. Davis plans more work at Ferrell's Bridge in 1958.

Assembled by W. H. SEARS

MIDDLE AMERICA

A generation ago, interest in Middle American archaeology was promoted largely by museums anxious to acquire collections of works of art and to provide them with a sound background of history and anthropology. The expansion of this interest and the institution of long term projects of research were impeded, however, when laws were passed against the exportation of antiquities; with the rise of the anthropological sciences, the focus of interest gradually but steadily shifted to academic institutions. In recent years the participation of students and faculty members of American universities in Middle American research has been greatly facilitated by the availability of short grants-in-aid provided by various foundations. The effect of this has been to reverse the trend toward specialization and to bring to bear on archaeological problems many varied interests. The danger of scattering such efforts in minor projects that cannot be expected to bring substantial results, is offset by the creation of university sponsored programs that provide for student participation and that then organize and direct their activities. This pattern of operation is developing very rapidly and we wish to review here 5 such projects and to call attention to the manner in which each handles its coordinative problems.

The project which is most intensively oriented toward providing field experience for students was instituted by Mexico City College in 1947. Since 1953, archaeological excavation has been centered at Yagul, a Mixtec site on a hill overlooking the Tlacolula valley. The operation of this project is closely tied in with the academic program of the college. Students are required to take preparatory courses dealing with Mesoamerica, with field methods, ceramics, and surveying, and to follow up their field work with a laboratory course. Material is often worked up in the form of a master's essay, and from time to time results are summarized in *Mesoamerican Notes*. Each year 12 to 15 students participate in the program. Field work is organized in groups of three or four, with a supervising faculty member directing not more than 2 groups. As with every archaeological project, the program of providing sufficient time and resources to work up material and to publish results requires serious consideration. John Paddock, at present in charge of the project, writes: "Since students are normally nearly at the end of their time with us when they do field work, we have had a grave problem with the study of materials. Too often the job has not been finished by the time they leave. The Oaxaca Centro is a part of our remedy. There we will be able to push forward the working of materials during the same quarter that excavations are being carried out. Other policies aimed at solution of the same problem include the adoption of a slower pace in excavations (however, this is determined in part also by our desire to work habitation areas where more detailed, slower digging of smaller areas will be the rule). And we are still experimenting with adaptations of North American methods to the Mesoamerican situation. Here we face the dilemma of wanting to adopt the leisurely and precise North American methods, while we are under pressure to *produce* at a more typical Mesoamerican pace. Since we have worked at Yagul for several seasons on the more usual grand scale, emptying large buildings by moving many tons of earth, we feel that now we can take a season or two for more refined work which may well be more productive of data on daily life."

The Centro de Estudios Regionales recently established in Oaxaca will serve not only as a permanent field station for the work of the College but will offer important facilities to visiting scholars working under short term grants and will no doubt help to coordinate small projects undertaken in the region.

Another project very closely integrated with a college curriculum has been operating in Durango under the auspices of Southern Illinois University. Intensive excavation has been concentrated on the Schroeder site, the importance of which lies principally in its location on the periphery of the Mesoamerican area, and in contact with regions related to the American Southwest. The study of this site is now nearing completion, and a recent communication from Howard Winters states: "We shall return to the Schroeder site to clear up some critical points that have arisen as a result of our previous excavations there. The past year has been a very productive one in terms of our analysis of excavated material, and I think that we can safely say that the Chalchihuites culture is now well documented in its basic pattern as represented in the Southern Durango area."

It is interesting to note that the experience of this project closely parallels that of Mexico City College in fixing the limit of a manageable student group. "We have found," writes Winters, "that an optimum size for the student group is around 15 students. . . . In 1956 we had 27 students and found that we simply couldn't give the individual student sufficient attention or supervision

We estimate that with our type of program there should be one staff member for every 4 students."

Students registered for a graduate course are required to submit a paper of publishable quality within a year after the end of the session. The University of Wisconsin has accepted one such paper as an M.A. essay, and others have been submitted to the University of Chicago. The final report will be prepared by the staff and it is hoped to use the university press for its publication. Nevertheless, some problems remain. "This leaves," writes Winters, "a number of smaller reports unpublished, and there is at the moment little chance that they will be published. Most of these are of a technical nature and cover topics that would be of considerable interest to specialists, but are too limited in scope and too lengthy for inclusion in the standard journals in any form."

The project of Stephan Borhegyi in Guatemala is run on a less permanent basis, but has been in successful operation for several seasons; it is made possible by the cooperation of San Carlos University, the Instituto de Antropología e Historia de Guatemala, and the University of Oklahoma. Teaching and research are carried on simultaneously during a 6-week summer session at San Carlos. Classes are held in the morning, and the afternoons are devoted to excavations at the nearby site of Kaminaljuyú, in collaboration with the work of Gustavo Espinosa who is in charge of the Instituto's activities at the site. Last year, while government work was concentrated on a series of constructions underlying one of the large ball courts, which, in the process of reaching the lower layers, had to be largely destroyed, Borhegyi's group cleared another ball court, C-II-7, in order to expose a structure of this type.

The class also joined a group of aqualung enthusiasts at Lake Amatitlán. A map of the lake was made, indicating locations of the more abundant archaeological material. This material, in addition to a few stone sculptures, includes many elaborate incense burners, some of hitherto unknown types, many decorated with representations of plants and animals. Some of the small offering vessels were found on the lake floor stacked in piles of six or seven, and suggesting that they were deposited as offerings at a time when the water level was much lower than at present.

"This year I had 30 students enrolled in my class," writes Borhegyi. "Ten of them came our regularly for the excavation. This group is still too large for proper supervision and instruction." The archaeological material excavated is marked, restored, and classified the following summer. Another summer is required for photography and study, since this work is carried out during rainy days when field work is impracticable. Three summers' work is thus necessary to follow an excavation through to publication, and most students, therefore, participate as assistants and probably do not see a project through to completion, the project being designed to provide field experience on an undergraduate level. Results have been published by the director in AMERICAN ANTIQUITY, in the *Revista* of the Instituto de Antropología e Historia, and in *Middle American Research Records*.

The research sponsored by Harvard University, though not directed primarily to student instruction, provides opportunities for student assistants in the field, and integrates the work of graduate investigators into a broader program of research than they can individually cover. Pursuing the interest in Maya settlements which was the core of the Barton Ramie project, just completed, William R. Bullard will explore northeastern Petén to locate habitation sites and to study their concentration. The project is expected to take 3 or 4 months. It is hoped that recent exploration undertaken by various oil companies in the Petén will facilitate travel through that difficult country and will open new areas to survey. Another Harvard student, Michael D. Coe, is seeking to extend the known sequence of cultures in the Maya area by locating sites on ancient raised beaches which extend along the Pacific coast of Guatemala. Virtually no archaeological work has been done in this area, which represents an ecological zone not yet covered by other surveys of the Maya culture.

In February, Gordon R. Willey and A. Ledyard Smith plan to do some preliminary excavations at the site of Altar de Sacrificios, which lies near the geographical center of the Maya area at the confluence of the Pasion and the Chixoy rivers. This site is being considered as a possible focus of studies to be undertaken in the near future. Archaeologists have long been interested in it because of its location on what must have been a point of convergence of trade routes linking northeastern Petén with the Usumacinta and the highland regions. There is every reason to hope that a thorough study of this site will integrate regional sequences of culture of many parts of the Maya area. The nature of the urban development of a trade center of this kind in the Classic period is also of prime interest to archaeologists.

Like Harvard, the University of California (Los Angeles) does not plan its research with field training as a major objective, but offers experienced students opportunities as assistants in the field. The material gathered by Brainerd at Portesuelo is now being studied by H. B. Nicholson of the University staff, who worked briefly at the site last summer. Clement Meighan and Jaques Bordaz are collaborating on the study of data obtained from coastal Nayarit in 1956, the latter with the view of presenting a Ph.D. thesis at Columbia University.

Even from this brief and incomplete review it is clear that university projects originating in the United States cover many sections of Middle America. Perhaps one of the most useful features of this new expansion of interest is the growing realization of the need to make accessible to other than participating students the material which is recovered from excavations. A number of investigators have undertaken to prepare sample collections and to exchange them with other institutions. Winters, writing for Southern Illinois, expresses strong concern in the matter: "We have already made several commitments for distribution of sherd collections when our studies

have been completed. . . . In all instances where we have material beyond our own needs, we shall be most happy to arrange permanent loans or exchanges with institutions or individuals who are in need of such material. Certainly such study collections must be made available to institutions providing training in archaeology as a profession." It is hoped that all major projects will collaborate in the preparation and distribution of study collections and that it will become standard practice. Some investigators also feel that interuniversity cooperation can be extended to planning broader programs of research and providing for their publication.

The rapidly changing organization of research is providing greater opportunities to younger investigators to gain a first-hand acquaintance with Middle American archaeology, and research is passing from the hands of a few experts who devoted their lives to a study of a single region to a far wider group of investigators with many varied interests. This has had a stimulating effect on the field and has brought many fruitful results. Nevertheless, it cannot altogether replace the concentrated long-term study of major key sites, which unfortunately is left more and more to government-sponsored projects, directed largely to the restoration of ruins. The project being initiated at Tikal by the University of Pennsylvania Museum is at present the only major enterprise of the sort which can serve as a base to which results of lesser excavations can be keyed. Its success or failure may determine to a large extent the future pattern of organization of Mesoamerican research and the possibility of achieving a balance between large-scale major undertakings and varied projects of limited scope, which would provide the optimum research coverage for the field.

Compiled by TATIANA PROSKOURIAKOFF

LOWLAND SOUTH AMERICA

A general summary of the status of archaeological knowledge in the Amazon basin appeared in this section 3 years ago (AM. ANTIQ., Vol. 20, No. 4, pp. 410-1, 1955). In the years since, summaries have appeared on the southern lowlands and on the Caribbean. The assistant editor in charge of this section has heard no comment whatsoever on the utility of these summaries, perhaps because they have passed unnoticed. With this issue, we turn once more to the Amazon, and in the absence of a mandate either to continue or to abandon this policy, we will continue a little longer.

It is an expression of the increasing interest in Amazon archaeology that some progress is visible during the past 3 years. Interestingly, the majority of the research has been done on the western and northern periphery, rather than in the center of the area. Lathrap's work on the Ucayali in eastern Peru (reported in this issue) and the excavations of Meggers and Evans on the Napo in eastern Ecuador have been mentioned earlier. Information on the intervening region comes from Michael J. Harner, who investigated 2 sites in the Upano River valley (eastern Ecuador) while engaged in ethnographic fieldwork in 1956-7. Harner believes the 2 sites to be of differing antiquity. The most recent is characterized by ceramics ancestral to present-day Jivaro pottery, but distinguishable from it. Sites of this culture have ridges of earth and stone 2 to 3 m. wide and rarely more than 100 m. long, the function of which is unknown. Urn burial appears to be the method of disposal of the dead. The second culture, of presumably greater antiquity, is also associated with artificial mounds. The pottery is distinguished by a decorative style combining incision with painting. These collections from Ucayali, the Upano, and the Napo are all undergoing analysis, and the results will be of great interest. Preliminary examination suggests that there may be a few correlations between the 3 areas, and some of the ceramic complexes show certain highland features not found farther down river. The similarities and differences that emerge in the final analysis should permit us to arrive at more specific conclusions about the role of Andean influences in the formation of tropical forest culture.

The survey of the northern periphery of the Amazon, begun in British Guiana, continued with the work of Cruxent, Evans, and Meggers along the Orinoco and Ventuari rivers in 1957. Analysis of this material is still incomplete, but it suggests several influences of Colombian origin.

One of the lacks until the past 3 years has been absolute dating for sites in the Amazon basin. Charcoal samples were obtained from the Orinco-Ventuari and by Harner from his eastern Ecuadorian sites. These will provide the first such dates, and it is to be hoped that the situation will be simplified rather than complicated by the results.

Assembled by BETTY J. MEGGERS

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